



FRIDAY, MAY 2.

Master Car-Builders' Association Circulars.

The following circulars from committees have been issued by the Secretary of the Master Car-Builders' Association:

FREIGHT-CAR ROOFS.

Assuming that the first object of a roof upon box cars is to be protection of the contents of the car from the elements, and second, to assist in giving strength and stiffness to the sides and ends of the car, and considering that car roofs are now commonly classified as follows:

1. What are known as double-board roofs, with or without felt or other lining between the boards.
2. Single-board roofs covered with tin or other sheet metals.
3. Roofs made of metal sheets fastened to carlines, etc., and covered with single boards.

Which of these forms of roofs, or others of which you may have knowledge, will best meet the following requirements, and what will be the relative cost and cost of repair?

1. Absolute protection from dampness, caused by rain or snow?
2. Least danger from being disturbed by wind?
3. Least danger from being damaged by nails being driven into it and men running over it?
4. Least danger from fire?
5. Best style to give lateral and diagonal stiffness to the car top. Also, whether some plan of diagonal bracing or tie rods should not be adopted?

Please send this committee drawings or points of such a roof as you would recommend as a standard, showing particularly the method of fastening to car lines, ridge pole, side-plates, and end-plates, and also please state your reasons for recommending the particular style of roofing.

F. M. WILDER, } Committee.
R. C. BLACKALL, }
D. HOYT.

Answers to the above circular should be sent to F. M. Wilder, Chairman of Committee, New York, Lake Erie & Western Railroad, Susquehanna, Pa.

THE GAUGE OF WHEELS.

From the answers to the questions contained in the circular issued by your secretary, with reference to "The Gauge of Track, Location of Guard Rails," etc., which have already been received, some of the discrepancies in the practice of laying permanent way are made apparent. For the purpose for which that circular was prepared and sent out, it is equally important to know the differences which exist in the gauge of wheels. You will therefore assist in accomplishing the object of the circular—which is the adoption of standards for the gauge of wheels and track—by sending answers, as early as possible, to the following questions:

1. How much does the distance between the backs of the flanges of car-wheels vary in practice from the standard distance—4 ft. 5½ in.—which has been adopted by the Master Car-Builders' Association?
2. If you can do so, give the greatest and least distance between the backs of flanges of wheels which you have measured under foreign cars?

Answers to this circular should be sent to M. N. Forney, Secretary, No. 71 Broadway, New York.

AUTOMATIC FREIGHT CAR-COUPLER.

1. In your judgment would there be a large saving to the railroads of the country by the adoption of a standard automatic coupler?
2. Would the adoption of such a coupler be safer for train men?
3. Is it practical or desirable to adopt such a coupler for all new constructions or renewals?
4. If so, will you please make any suggestions which may occur to you as to the best methods to secure these results.
5. Which, in your judgement, is the simplest and most economical freight car-coupler in service, all things considered?
6. Are there any practical difficulties in the way of adopting a standard automatic coupler?
7. If any, please say what, in your judgment, they are.
8. If you were asked to adopt a standard freight car-coupler for your road, what one would you select?

J. W. MARDEN, } Committee.
F. D. ADAMS, }
R. C. BLACKALL, }

Replies to this circular should be addressed to J. W. Marden, Chairman of Committee, Master Car-Builders, Fitchburg Railroad, Boston, Mass.

Nut Locks.

What may be, abstractly, the best form of nut lock will probably always remain a mystery, like the best form of car coupler. That the form shown in our engraving of Smith's patent 'lock-nut bolts' is a good one and fairly to be counted among the six or eight best devices for the purpose, if not a still smaller number, seems tolerably clear. We are credibly informed that it is meeting with approval on many lines.

The principle of the device is sufficiently clear from the engravings. The nut proper is first screwed up as tight as desired on the main thread. At the end of the bolt is a short and smaller thread, turning in the reverse direction, on which the lock nut (a thin plate of iron cut from waste scrap) is then screwed up tight and one corner of it knocked over the nut. The device works most conveniently with a hexagon nut and square washer, although this is not essential.

That the device thus constructed is an absolutely sure and positive nut lock is beyond question. The two nuts cannot turn together without stripping the thread from one or the other, and the outside nut or washer cannot be turned separately without bending back the bent-over corner. The only question, therefore, as compared with other devices that accomplish the same end is that of comparative cost, and of the expediency of doing away with a washer altogether, as is done in this device and several others.

The cost of Smith's lock-nut bolt is quoted to us at 5 cents each. Plain bolts of good quality, with hexagon nuts, now cost 3½ to 3 cents each, and Verona or vulcanized fibre

washers from 1.7 to 2 cents each. This would so far substantiate the claim of the manufacturers that the Smith bolt can be sold at from ⅓ to ½ cent less cost per bolt than those devices. At any rate, the difference in cost cannot be a very material one.

It seems as if a cheaper device than either might be a modified form of the Atwood lock nut, which is controlled by the same parties as the Atwood, and which we understand is now about to be introduced. It is shown in outline in Fig. 3. The nut is simply made from a double concave instead of rectangular bar, so that it has from its original form the same elasticity and binding power as is obtained in the present well-known Atwood nut by cutting slots across its upper surface and slightly hollowing its base.

An objection frequently made to any form of nut lock

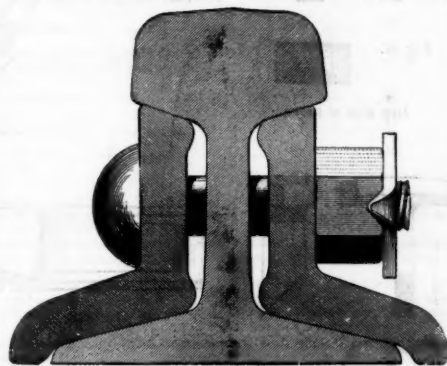
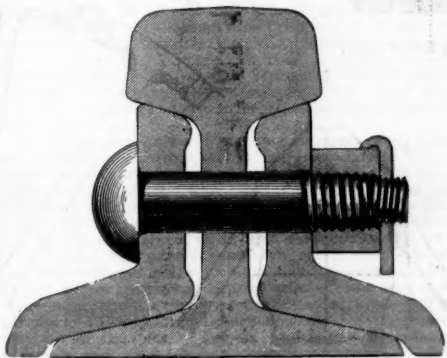
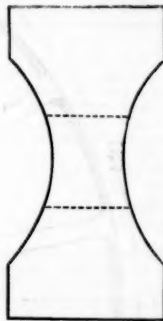


Fig. 1.

Fig. 2.
Smith's Patent Lock-Nut Bolts.

which dispenses with a washer is that an elastic washer is in itself necessary, or at least desirable, to provide for variations of temperature and natural wear of the parts. It does not seem probable that there is much force in this argument. So far as temperature is concerned, there is absolutely no necessity for any compensation whatever, for the whole rail, joint and all, expands and contracts with temperature together. This is often forgotten, at least for the moment, in examining nut locks. There is, however, a certain natural wear of the parts which enables the fish-plates to be crowded in closer and closer under the rail and so causes the bolt to work loose even if the nut does not turn. But when this is the case it does not seem probable that any

Fig. 3.
Improved Atwood Nut.

available elasticity is sufficient to add material advantages to such forms of nut locks, since the fish plates themselves serve in some degree for this purpose.

The nut lock shown in Figs. 1 and 2 is provided with a light chuck-wrench for screwing up the thin nut lock without the necessity of having to use care against interfering with the inside nut, thus saving some inconvenience.

Heating and Ventilating Passenger Cars.

At the meeting of the Master Car-Builders' Club in New York April 17, the above subject was discussed.

Mr. MARTIN, representing the system of the New York Steam Heating Co., which has been in use about two years, explained his device. The method is to heat cars by steam, either from the locomotive or from a special heater. To accomplish this a main pipe is run under the car just as for a Westinghouse brake, and on the end of that main pipe an adjustable joint is attached which conforms to the motion of the car. At the centre of each car that main pipe is tapped and comes up under the seat. Under the centre of the coach is hung a steam-trap. Any car of the train can be cut out without interfering with the others. If steam is not wanted in a car there are two valves by which to shut it

out. A pressure of from 5 to 8 lbs. is carried, a reducing valve being used at the locomotive. In case the train is derailed the couplers slide out without injury. The cars heat up at a rate of about a degree and a half every minute. In heating a train of five cars the engineer has not been able to discover any objectionable loss of steam. The steam can be shut off and the car will remain comfortably warm for an hour. It is in use on the Dunkirk, Allegheny Valley & Pittsburgh and is to be put on the Cleveland, Columbus, Cincinnati & Indianapolis. It has been run on five cars to a train.

The supply pipe is only 1 in., but the radiating pipe is 2 in. in diameter. When the train comes in the trap gets rid of the condensed water, and all the brakeman has to do is to couple up the steam couplings when he couples his cars, and signal the engineer to turn his steam on. From a temperature of 0° the car can be heated to 60° in about 40 minutes. For longer trains of 6 to 14 cars it is expected to use a special heater.

In a depot cars are heated by a main from the stationary boiler, unless there is an independent heater to run with the car.

The difficulty of heating cars which are allowed to stand but a few minutes fast enough was then touched upon, and the necessity for special arrangements in such cases admitted.

A representative of the Speir system of heating then described his apparatus. The plan is to admit fresh air through a ventilator on the roof, passing it down a pipe to the base of the heater; the air then comes into contact with the heated cylinder and feeds itself into the car through a tin pipe running on each side of the car, its outlets being six on each side—4 x 6 in measurement. The air coming down this pipe as it strikes the cylinder becomes heated. It is known that any room or car must be supplied with air. You cannot extract the air and ventilate properly without supplying air. The system has been in use for 25 years. The speaker said further, in relation to the Speir system, that if there had been any objection to it it was that it heated the car too much, and so within the last year the manufacturers supplied a heated draught regulator. In pleasant weather it can hardly be perceived that there is any heater, and the atmosphere of the car is perfectly comfortable. The air is passed over cast-iron, but scientific men claim that coming in contact with the heated surface does not change the chemical qualities of the air. With steam heating the principle is radiation, while the Speir is a mixing of hot air with cold air. Steam heating makes a moist heat. A car heated with steam is not ventilated at all. To ventilate it from the roof drives out all of the heat, and the cold air remains.

Some cinders come in in ventilating, but there is a small door at the base of the stove by which to remove them. Not enough will collect in a year's time to prevent the passage of air.

Mr. ADAMS asked if this system was used more extensively than the steam heating.

The speaker thought it was. It was a more simple mode. Simplicity and economy, and the general adaptability of the system recommend it. A car can be heated at any time. A somewhat acrimonious discussion then took place on the claims advanced by the gentleman in respect to ventilation.

Mr. GOUGE, after cross-examination which developed nothing definite, stated that 10 cubic feet per person per minute was necessary and sufficient for excellent ventilation, and criticised the Speir heating system for making inadequate arrangements in this respect.

Mr. S. C. HILL, of Washington, exhibited a drawing of a ventilator which he said was in operation on the Baltimore & Ohio Railroad.

Mr. CREAMER said he had contrived a plan for heating cars, for which he had made drawings and was now making patterns, and in a month or two he would have his heater arranged. It is a combination of hot water and hot air. He makes a fire chamber 4 in. in diameter with an exterior shell of about 8 in. The bottom of the fire chamber is a furnace, and just above it is a coil of pipe. The pipes run along the sides of the car; the cold water is put into a reservoir inside the car, and the hot water circulates through that. The object of the hot water is to heat the car when it is standing still, so that there will be sufficient heat radiated to make the car reasonably comfortable while it is waiting in the station. When the car is put in motion the air is admitted on the side of the car through one of the windows. Sheet-iron work is put in the windows with two deflectors, each of which opens about 3 in. from the line of the car. When the car goes one way, one of them is open, so that the air will be driven in along the channels under the seat; when the direction of the car is changed that deflector is closed and the other is put out. If the car is too warm, both of the deflectors may be left open. This system of heating was not to interfere with any system of ventilation. Mr. Creamer thought this system of ventilation would aid the system of heating.

A representative of the New York Car Heating Co. then explained its system, which consists mainly in the use of an acetate of soda solution hermetically sealed inside of two boiler-tubes. The boiler-tubes are welded to a common head. The compound will hold heat for 24 hours. It had been tested on the surface roads in New York. The system is now in operation in 70 of the Brooklyn & Newtown Railroad cars, and it had held heat there for six, seven, eight and ten hours. The compound takes only from 15 to 20 minutes to dissolve. It is about to be introduced on steam roads. It is claimed that a train of cars can be carried from New York to Buffalo with two heatings and kept perfectly comfortable. The connections between the cars are such that the minute the steam-valve is opened to dissolve the compound in this reservoir a little ejector is opened on the locomotive, which takes the condensed water back into the tender again. The apparatus could be put in for about \$175 per car.

English Railway Wheels.

III.

LOCOMOTIVE DRIVING WHEELS.

In previous articles the principal varieties of wheels used in England under passenger and freight cars were illustrated and described. We now give illustrations showing the mode of making driving-wheels. Probably owing to the inferior quality of the cast-iron this material has never been much used in Great Britain for driving-wheels, and hardly ever in the hollow-spoke form usual here. Early driving-wheels had cast-iron hubs bored out accurately to receive turned tubular spokes. A T-shaped piece was welded to the rim end of the spoke and riveted in turn to a continuous wrought-iron band which formed the rim or inner tire of the wheel. This method of construction has been long since abandoned and a wheel composed wholly of wrought-iron has taken its place. Provided the welds are sound, this wheel forms a solid and enduring structure, though, as will be seen, the

great number of welds, four to every spoke, make it expensive.

The first stage of the process of making a driving-wheel is to form the hub and rim ends of the spokes. These are drawn down from the solid and stamped to shape, see figs. 15 and 16. The two halves of the spokes are then welded together by a scarf weld, their ends being suitably shaped for this purpose, as shown. The spokes thus made are assembled together, with the hub ends touching, or the spaces between them packed with small pieces of iron to form a weld. The spokes are firmly clamped together by a ring which is slung from a crane by means of trunnions, and can thus be easily handled and reversed. In order to form the hub or "boss," two wrought-iron washers of the section indicated by dotted lines on fig. 18, are heated in a separate fire, while the assembled spokes are swung over a large circular fire, and the hub ends of the spokes heated to a welding heat. When all is ready, the assembled spokes are swung by the crane to a steam hammer, the washer is placed on the spokes and the whole mass is welded up, forming, if the operation be successful, a solid wrought-iron hub, as shown in fig. 19. The mode of procedure may be varied in detail; some makers prefer to weld each washer on in a separate heat, while others hold that the whole operation ought to be completed in one heat. The welding may be done by using suitable dies and an hydraulic press. The steam hammers used are often made specially for the purpose, differing chiefly from other hammers in having widely spread standards, so as to take in the largest-sized driving-wheels, which measure 8 ft. diameter on the tread. The crank-pin hub is now generally made of a piece of the shape shown in fig. 17, which is stamped under the steam hammer. This is obviously more convenient than building it up with spokes of special length and shape.

The hub being formed, the isolated portions of the rim are welded together in order to complete the wheel. The wheel is slung from a crane in the smithy, by means of a suitable gear attached to a couple of trunnions clamped to the wheel (see right-hand side of fig. 19). The adjoining ends of the rim are placed successively over a fire, and raised to a welding heat; meanwhile a small V piece has been heated in an adjoining fire, and the wheel being laid on a Smith's anvil, the V piece is hammered into the space between the two ends of the rim, and a weld is effected. The wheel is then turned over in the trunnions, reheated, and the operation is repeated on the other side. The V pieces are shown in dotted lines in fig. 19. The gaps in the rim are thus closed up, one by one, the trunnions being shifted as required, so that the wheel can be readily handled.

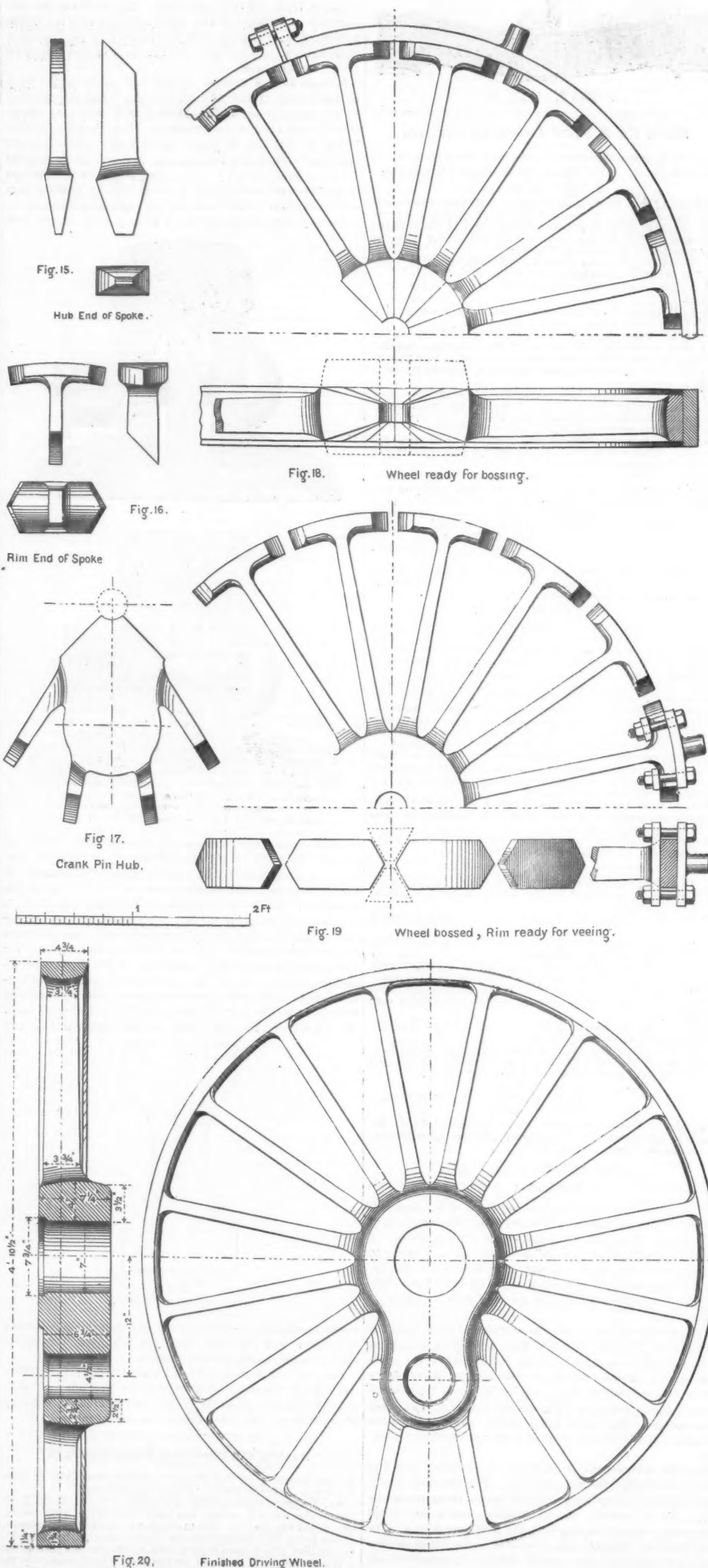
The wheel is then a solid wrought-iron structure, but the hub and rim especially are rough, and require the superfluous metal to be turned off. The spokes generally require but little dressing. The rim is, of course, faced on both sides and turned to size on the outside to fit the tire. The inner side of the rim is sometimes dressed up with a slotting machine made for the purpose, the cutting edge of the tool moving in an arc of a circle instead of in a straight line. The hub is faced and bored, and the curves, joining hub and spokes and axle and crank-pin hubs, may be either dressed up by hammer, chisel and file, or milled by a suitable milling machine, having a heavy vertical spindle overhanging a large horizontal compound table to which the wheel is secured.

The counter weights are often forged solid with the spokes under the steam hammer, before the spokes are welded into a wheel. This method gives a neat appearance, but the great rigidity of the rim at the balance weight tends to crack the adjoining plain portions of the rim on the well-known principle that a sudden alteration of section is certain, sooner or later, to lead to fracture in a structure subject to severe and constantly changing strains. The older, and in some respects the better method of attaching balance weights is to make them of suitably shaped blocks of cast-iron fitted tight between the spokes, and kept in place sideways by wrought-iron plates, riveted together through the blocks. It is a little difficult to make the plates look flat when the riveting is finished, and if the work is not carefully done the rivets and blocks occasionally get loose and require renewing.

The wheel is then pressed on the axle by a hydraulic wheel-press, with a pressure of from 18,000 to 27,000 lbs. per inch diameter of the axle in the wheel-seat. The invariable practice in England is to make the wheel-seat larger than the journal, the difference in diameter varying from $\frac{1}{8}$ in. to 1 in. The collars are forged solid on the axle, and are sometimes recessed into the wheel, as shown in fig. 20, but the collar bearing against the wheel is often omitted. Practice differs as regards taper or straight fits, but one key is invariably used. The wheel is then quartered, the crank pins forced in, and the tire is shrunk on, secured by studs, bolts, or rivets, as the case may be, turned, and the wheel then only needs painting to be finished. Tender and engine truck wheels are made in a precisely similar manner, except, of course, that no crank-pin hub is required.

Mr. Stroudly, on the Brighton Railway, has now adopted this method of making both freight and passenger car wheels. The former are 33 in. and the latter 39 in. diameter inside the tire, and both have nine spokes. The hub is welded up by an hydraulic press, the washers, spokes, etc., being placed in suitable dies. The hub is 8 in. deep, the washers being each 3 in. thick at the wheel-seat, and tapering thinner toward the outside of the rim, and thus there is plenty of solid metal to resist the bursting strain caused by the pressure of 135,000 lbs., used to press on car wheels.

Wheels made in this manner may be said never to fall



ENGLISH RAILWAY WHEELS.

WHISTLE SIGNAL RECOMMENDED BY
SUPERINTENDENTS' ASSOCIATION.

Original, Oct. 18, 1881.	As revisions of Gen. Time Conv. April 21, 1884.
—	—
o	o
—	—
oo*	oo*
Succession of o +	Succession of o +
(Running) o o o	o o o
(Standing) b o o	o o o o o
—	—
o o o o o	o o o o o
—	—
o o	o o
(None.)	o o o
Succession of o	Succession of o

WHISTLE SIGNALS RECOMMENDED BY TIME CONVENTION COMMITTEE, OCT. 11, 1883.

Signal.	Use.	No. of roads.	Per cent. of train mileage considered.	Per cent. of train mileage of U. S.	Remarks.
—	Signal for approaching stations, rail- road crossings and junctions.	41	70	50	
o	Apply brakes; stop	73	93	68	
+	Off brakes; start	6	20	15	
oo*	Answer to any signal, except train parted.	4	8	6	61 roads, representing 70 per cent. of train mileage considered, make no provision for this signal.
Succession of o +	Train parted	3	16	12	58 roads, representing 58 per cent. of train mileage considered, and 42 per cent. of U. S., have no signal for this purpose.
(Running) o o o	Back up	76	100	73	
(Standing) b o o	Calling attention to signals carried.	9	23	19	33 roads, representing 41 per cent. of train mileage considered, and 28 per cent. of U. S., have no signal of this kind.
—	Call in flagman	12	29	21	
o o o o o	Engineer's call for signals from switch- men, watchmen and trainmen	28	54	40	
—	Road crossing	10	28	20	
o o	Send flagman out	6	17	12	59 roads, representing 66 per cent. of train mileage considered, and 52 per cent. of U. S. have no provision of this kind.
(None.)	Stock alarm	38	49	36	
Succession of o	Succession of o				

Explanation of signs: o short sound; — long sound; (S) slow pulls; (R) rapid pulls.

* In the original recommendations this signal covered only a response to signal to stop at next station. Now extended to mean a response to any signal.

† To be used as stock alarm and also signal of danger of any kind, including train parted.

NOTE.—The figures in columns headed "No. of Roads" refer to the number of roads already using the signals recommended of those whose signals were considered.

‡ The committee have deviated from the custom most generally in use (two short blasts), believing that two long blasts is better for a signal to start, and that two short blasts should be used by the engineer to answer conductors, flagmen and others giving him signals.

§ The committee have also deviated from the general custom in recommending four long blasts of the whistle to call in flagman. According to the statistics, forty-six roads, covering 51 per cent. of the train mileage considered, and 36 per cent. of the total mileage of the United States, use four short blasts. We not only think that four long blasts answer the purpose better, but that it is the common practice, notwithstanding the general rules on the subject to the contrary. Besides this, twelve roads, representing 29 per cent. of the train mileage considered, and 21 per cent. of the total mileage of the United States, use the four long blasts.

|| On many roads it may not be considered advisable to adopt any signal to send flagmen out, but when thought necessary the committee recommend the use of the five short blasts, when from sudden emergency the engineer considers it necessary to notify the flagman that the rear of the train must immediately be protected.

suddenly, or give way in such a way as to cause any damage to the engine or train. In some cases the rim gradually works through the V welds, but can still be run with perfect safety until the engine comes in for a general repair, when the tire can be removed, and the rim cut and re-ved. In some cases the lower ends of all the spokes have been cut off old wheels with a sound hub, and a heavier rim substituted. A more serious sign of weakness is the opening of the welds between the ends of the spokes in the hub. It is obvious that the pressure with which the axle is forced on tends directly to separate the welds. The washers are the only solid metal resisting the bursting force, and, as will be seen from the fig. 20, the hub being chiefly on the outside of the wheel (in order to get the axle-boxes as far apart as possible), the inner washer is very thin, and is of little assistance should the spoke-ends be imperfectly welded together. Wheels, however, are seldom condemned from this cause, and nearly always outlast every other important part of the engine. Wheels under 6 ft. diameter on tread seldom give any trouble, and their tires are less apt to get loose than the larger sizes.

The following are some finished weights of a pair of wheels and axle complete for an 18 x 26 in. cylinder freight engine on the North British Railway. The balance weights are forged solid with the wheels, which measure 60 in. diameter on tread. The tires are secured by Drummond's patent fastening, illustrated in Fig. 6 of our first article, which, however, gives the dimensions for a freight-car tire, the locomotive tires being 3 in. thick and 5% wide. These wheels cost \$125 each, rough turned and bored, without tire, etc. This price, 8 cents per pound, includes manufacturer's profit.

Two wheels.....	3,010	lbs.
Two tires.....	1,876	"
One axle.....	896	"
Two keys for do.....	7% ¹ / ₂	"
" safety rings.....	67	"
" crank pins.....	135	"
" washers for do.....	12	"
Total.....	6,003% ¹ / ₂	lbs.

Similarly, a pair of wheels and one axle for an American type freight and passenger engine, with the same size of cylinder, but wheels 73 in. on tread, weighed 7,742 lbs. Each wheel in the rough, before being machined, weighed 1,988 lbs., and finished 1,562 lbs. without tires or balance weights. Both these engines weigh about 33,000 lbs. on each pair of drivers, and the wheel shown in fig. 20 carries a similar load. A pair of drivers, axle and crank pins, etc., for an American type passenger engine for the Caledonian Railway, illustrated in the *Railroad Gazette* for June 10, 1881, weighs 7,084 lbs. The cylinders are 18 by 24, and the wheels are 84 in. diameter on tread when new, and are loaded with 28,700 lbs. These figures will give our readers a fair idea of the weights usual in good English practice.

Association of American Railroad Superintendents.

The semi-annual meeting of this Association was held in New York, April 21 and 22. R. Stewart, General Manager of the Chesapeake and Delaware Canal, was elected Chairman *pro tem*.

The following gentlemen were elected members:
C. S. Davidson, Division Superintendent New York, New Haven & Hartford Railroad.

H. M. Britton, General Manager Rome, Watertown & Ogdensburg Railroad.

F. M. Baker, General Superintendent Addison & Northern Pennsylvania Railroad.

G. S. Garwood, Superintendent Williamstown & Delaware River Railroad.

C. A. Hammond, Superintendent Boston, Revere Beach & Lynn Railroad.

J. Mulligan, Superintendent Connecticut River Railroad.

J. H. Jones, General Superintendent Ulster & Delaware Railroad.

The following officers were elected:

President, D. W. Sanborn, Eastern Railroad; First Vice-

President, W. H. Stevenson, New York, New Haven & Hartford Railroad; Second Vice-President, J. M. Metheany, Grand Rapids & Indiana Railroad; Third Vice-President, Peyton Randolph, Virginia Midland Railroad; Secretary, Waterman Stone, Providence, Warren & Bristol Railroad; Assistant Secretary, F. S. Gannon, New York City & Northern Railroad; Treasurer, R. M. Sully, Petersburg Railroad.

The attendance at the convention was not large, numbering probably not more than 24 members in all. The meetings, however, were quite animated, and its size in some degree facilitated the transaction of business, as the discussions were quite general and animated. The subject of "Honesty of Conductors" was first taken up somewhat informally, the committee on that subject having asked to be relieved. The general purport of the discussion was that a sufficient check upon cash collections was obtained by collecting on the cars an additional sum of not less than 10 cents to be repaid at any ticket office by a rebate check. A new form of conductor's cash-collection slip, recently put into use on the Grand Rapids & Indiana Railroad, was exhibited and is elsewhere given. The question of an adequate check against the suppression and re-selling of tickets collected was discussed with some animation, but without any definite or even informal result.

The subject of "Uniform Train Signals" occupied the greater portion of the time of the convention. It may not be generally known that this association took up the subject at their meetings, Oct. 18 and 19, 1882, and submitted a list of signals by whistle, bell-cord, lamp or hand which are almost exactly identical with those recommended by the General Time Convention. In this meeting the association reconsidered its action in reference to two or three of the whistle signals and recommended modifications in the signals proposed by the General Time Convention, and in part by themselves likewise. The hand and lamp and bell-cord signals were taken up one by one and approved. The most important change proposed in the whistle signals was the use of three different signals of three blasts each to mean three different things, as proposed by the Time Convention, it being held in the meeting that the distinction between long and short blasts and between short blasts slowly and rapidly given was too fine a one to rely on in practice and liable to prove dangerous. The convention therefore recommended that the signal of three short blasts to call attention to signals carried should be changed to five short blasts, and that the signal of three long blasts, to indicate train parted, should be changed to a succession of short blasts, the same as the stock signal; also, that the signal of five short blasts to send out flagman recommended by the General Time Convention should be changed to three short blasts, the same as to back up, on the ground that the flagman should go back in any case, and that the train could not be backed without the action of the engineer who gave the signals. This proposal, however, met with somewhat decided opposition, and would seem to be open to some objection on the ground of convenience if not of safety.

The association also recommended that instead of carrying a combined green and white signal to indicate an irregular train following a simple white signal, and disapproved of the use of a white signal on the front of an engine to indicate that the train is itself irregular, without recommending any substitute. It was then resolved that action at the previous meetings conflicting with the foregoing be rescinded.

The next meeting was voted to be at Young's Hotel, Boston, Tuesday, Sept. 16, to continue two days, with a trip to the White Mountains after adjournment, for which the Secretary was instructed to arrange.

The table given above represents the action taken at the two conventions of the Association of Railroad Superintendents and also by the General Time Convention.

Transportation in Congress.

In the Senate on the 24th:

Mr. Frye, from the Committee on Railroads, reported favorably the bill introduced by Senator Miller, of New York, to provide for the construction of bridges across Staten Island Sound, known as Arthur Kill and Kill Von Kull, with amendments. The bill authorizes the Staten Island Rapid Transit Railroad Co. to build a bridge across the sound from a point at or near Elizabeth, N. J., to the town of Northfield, N. Y., and the Staten Island Railway Co. to build a bridge between the city of Perth Amboy, N. J., and Westfield, N. Y. It authorizes the companies named to charge a reasonable rate of toll, such rate to be subject to the approval of the Secretary of War, and to change by him from time to time. It provides that the bridges shall be pivotal draw-bridges, each with a draw over the main channel of the river at an accessible and navigable point,

and with spans of not less than 200 ft. in length in the clear, on the sides of the central and pivot pier of the draw, the next adjoining spans to the draw to be not less than 250 ft., if the proper location of the draw over the channel will admit of spans of such width between it and the shore; that the spans shall not be less than 15 ft. above low-water mark and not less than 10 ft. above extreme high-water mark. It provides that the bridges shall be built under and subject to such regulations for the security of navigation of the sound as the Secretary of War shall prescribe, the plans and specifications for the bridges to be submitted to him and approved before the construction of the bridges is begun.

On April 24 the Senate Committee on Railroads unanimously agreed to report, with a few minor amendments, the bill prepared by Senator Cullom to establish a commission to regulate inter-state commerce. It creates a commission to be known as the Inter-State Commerce Commission, of five members, to be appointed by the President, by and with the advice and consent of the Senate. Not more than three of them shall be members of one political party.

"SEC. 2. The Commission shall have supervision over all matters pertaining to the regulation of commerce among the several states and territories, and the methods of operation of all transportation companies engaged in inter-state commerce, and it is made the duty of the Commission to enforce the provisions of the act by all lawful means within its power.

"If any transportation company engaged in inter-state commerce shall demand or receive, in the transaction of the business of inter-state commerce, more than reasonable rates of compensation, it shall be deemed guilty of extortion; or if any such company shall, directly or indirectly, by any rebate, drawback or other device collect or receive from any person a greater compensation for any service it may render in its transaction of inter-state commerce than it collects or receives from any other person for like service, or if it neglects or refuses to furnish equal facilities, it shall be deemed guilty of unjust discrimination."

Complaints of extortion or unjust discrimination are to be investigated by the Commission. If, in case the complaints are found to be well founded, the companies refuse reparation or to desist from the objectionable practice, the Commission is required to certify the facts to the District Attorney of the United States for the judicial district in which the act complained of occurred, and it shall be the duty of the District Attorney, at the request of the complainant to institute such proceedings in the name of the complainant as may be necessary to recover any damages sustained by him, and in case of failure to recover, the complainant shall pay the cost of the suit, attorneys' fees excepted. Any company convicted under the provisions of the act, either of extortion or unjust discrimination, shall forfeit and pay for each offense a fine of not exceeding \$1,000. Any company that shall neglect to make such annual reports as the Commission may require, or that shall neglect or refuse to answer any question or to produce any book, paper, contract, or document, or properly certified abstract thereof called for by the commission in making its investigations, shall be deemed guilty of a misdemeanor, and on conviction shall be fined in a sum not exceeding \$1,000 for each offense. Each Commissioner shall receive an annual salary of \$7,500, and the Commission shall appoint a Secretary, who shall receive an annual salary of \$3,500. In making investigations, the Commission is armed with power to require the attendance of witnesses, to administer oaths and to require the production of all books, papers, contracts, and documents, or properly certified abstracts thereof relating to any matter under investigation, and is authorized to conduct investigations in any portion of the United States. The Commission is authorized to require annual reports from all transportation companies engaged in inter-state commerce, to fix the time and prescribe the manner in which reports shall be made, and to require from such companies specific answers to all questions upon which the Commission may need information. Such annual reports shall show in detail the amount of capital stock issued, and the amounts paid therefor; the dividends paid, the number of stockholders, the funded and floating debts, and the interest paid thereon; the cost and value of the company's property, franchises and equipment, with a complete description of the same; the number of employees and the salaries paid each class; the amounts expended for improvements each year and how expended; the monthly earnings and receipts from each branch of business and from all sources; the monthly operating and other expenses; the balances of profit and loss, and a complete exhibit of the financial operations of the company each year. Such reports shall also contain such information in relation to rates or regulations concerning fares or freights, or agreements, arrangements, or contracts with other companies as

the Commission may require. The Commission shall make an annual report to the Secretary of the Interior, which shall be by him transmitted to Congress. This report shall contain such information and data collected by the Commission as may be considered of value in the determination of questions connected with the regulation of inter-state commerce, together with such recommendations as to additional legislation for the regulation of inter-state commerce as the Commission may deem necessary. The sum of \$60,000 is appropriated for the use and purposes of the act for the present and next fiscal years.

Master Car-Builders' Meeting at Buffalo.

A meeting of master car-builders was held in Buffalo, April 15. There were present the following gentlemen: John S. Lentz, Lehigh Valley; John Kirby, A. C. Robson, Lake Shore & Michigan Southern; L. Garey, J. R. Petrie, C. H. Burchard, New York Central & Hudson River; Charles Graham, Delaware, Lackawanna & Western; Alvin Strauss, E. H. Bowman, Pennsylvania & New York; Robert Miller, Michigan Central; Robert Potts, Canada Southern; J. D. McIlwain, Grand Trunk; M. Wilder, F. M. Wilder, New York, Lake Erie & Western; T. H. Munsell, New York Central Sleeping Car Co.; F. D. Adams, Boston & Albany; R. C. Blackall, Delaware & Hudson Canal Co.; William Fuller, Great Western; John McKenzie, Nickel-Plate; Allen Vaile, Buffalo, New York & Philadelphia; C. A. Smith, Union Tank Line; T. J. Frederick, G. E. Pratt, New York, West Shore & Buffalo; H. S. Billinger, Pullman Palace Car Co.

In the absence of Mr. McCord Mr. F. M. Wilder presided, and Mr. Lentz acted as Secretary. As a subject for discussion Mr. Garey propounded the question as to who should furnish bearing springs when they fail through fair usage and it becomes necessary to replace them—the owner of the car or the road on which the car happens to be when the springs give out.

After some discussion of this question the following resolution was offered:

"Resolved, That it is the sense of this meeting that all bearing springs under freight cars when failing under fair usage shall be replaced at the expense of the owner; and all draw or buffer springs that are broken or set, or show a permanent set one inch or more from the original position, shall be removed and others replaced at the expense of the owner."

Mr. McIlwain propounded the question as to what kind of spring should be replaced. Would one or another make answer? The Chair said he thought that under the rules of interchange of cars they would be expected to put in the same make.

The question of what was to be considered as fair usage was discussed at some length. Mr. Garey was called upon to explain what he meant by a failing bolster spring. He replied by saying that he considered a broken or dead, or nearly so, set spring a failing one. Discussion on the question of fair usage was resumed. Opinions differed somewhat. The Chair said he did not consider a spring which came down more than $\frac{1}{4}$ or $\frac{1}{2}$ in. when a car was loaded to its full capacity to be a good spring.

A division of the resolution being called for, the first part was carried. Discussion on the second part followed, and it was rejected.

On motion of Mr. Adams it was resolved that it was the sense of the meeting that all railroad companies should adopt buffer springs for freight cars of a capacity not less than 18,000 pounds.

The subject of changing defective car wheels was next brought up, and Mr. Lentz desired some kind of a resolution adopted calling the attention of the railroads to the matter of replacing car wheels and axles of foreign cars with those of a different pattern than were used on the road which owned the cars. This subject also included the question of how to protect themselves. A discussion followed, showing the requirements of the different roads and their practice in replacing car wheels and axles, and it was suggested that if all abide by the rules of the Association, this difficulty would be obviated. In answer to this suggestion it was stated that the trouble was mainly occasioned by those roads which sent no representatives to the meetings to join in the discussions.

Mr. McIlwain moved that it was the sense of the meeting that all wheels removed by one company from cars belonging to another company should be reported to that company; in other words, a blank bill should be sent. Mr. Garey amended that a charge of 50 cents should be made on all such wheels not otherwise chargeable. His object in making such an amendment was to make it an object for the forwarding of such reports. The amendment was voted down, and the resolution adopted.

Mr. Miller inquired as to the value of the wheel-grinding machine. The chairman stated that he had had one in use for two years, and considered it a very valuable machine.

Another subject, that of passing cars with old defects, was brought up by Mr. Garey, who asked if it would not be a good idea to place cards on all such cars. Line cars seldom have an opportunity to get home and be repaired. In the dull season they were placed on the side tracks, and when the busy season began they were put right into service. Cars were getting to be in a bad condition, and some plan should be devised to remedy the matter. If cards could be placed on such cars, stating the defects, place, and date, he thought good results would follow.

A general discussion followed, during which it was stated that by this system when it became necessary to repair such defective cars the card could be used as a voucher against the owner.

A resolution was offered by Mr. Garey that it was the sense of the meeting that condition cards should be used stating old defects of cars, and that they should be classed as non-chargeable defects against the parties using the cards. The resolution was referred back to Mr. Garey, who was instructed to present the matter at the meeting for the revision of rules next June. The Secretary was also instructed to present all the matters acted upon at the same meeting.

A committee of three, consisting of Messrs. Frederick, McIlwain and Robson, was appointed to formulate a plan for the organization of a club similar to those in other cities, and to present such plan at the next meeting. It was resolved to hold that meeting in Buffalo, Oct. 8 next.

A Standard Freight Car Truck.

The New England Railroad Club held its regular monthly meeting April 23, at its rooms in the Boston & Albany station, Boston. Mr. F. D. Adams, General Master Car-Builders of the Boston & Albany Railroad, in the chair. The meeting was well attended, some 70 members being present. After taking up and disposing of the arrangements for transporting delegates to the Master Car-Builders' convention at Saratoga from Boston, for which purpose Mr. Marden, Mr. Adams and Mr. Lauder were appointed a committee, the Club proceeded to the discussion of the topic for the evening, which was the "Feasibility of adopting a Standard Freight Car Truck," the proper details for the same and the best method for introducing it. A large

Recommendations as to a Standard Truck.

The following responses to a circular of New England Railroad Club have been received:

NAME.	Railroad.	Style of truck preferred.	BRAKES.		Box cover.	Springs.	Journal bearing.
			No.	How hung.			
Thos. Sutherland	C. & G. Tr.	G. T. St. diamond	8 wh.	Car body	Fletcher	Elliptic 2	M. C. B. standard.
J. Mulligan	Conn. R.	N. Y. Susp.	8 "	Inside	Woods	Ludlams' steel coil	
L. Garey	N. Y. C.	N. Y. C. iron dia. imp'd	8 "	"	"	Swing bolster	7 copper, 1 tin.
L. Packard	N. Y. C.	Swing bolts	8 "	"	"	"	"
E. A. Olmstead	N. Y. C.	Reading	8 "	Outside	Fletcher	"	Saddle back.
F. D. Chamberlain	Pr. & Worc.	Any recommended	8 "	To truck	"	A French elliptic	Lead-lined bronze.
Geo. Richards	B. & Prov.	B. & A. modified	8 "	Outside	"	"	"
W. B. Snow	Ill. Cen.	Plain diamond	8 "	"	"	Spiral cluster	Lead-lined.
Geo. Hackett	C. R. R. N. J.	Diamond	8 "	To truck	"	Steel coil 3	Brass and Babbitt.
J. Townsend	Ch. & Alt.	Imp. Potter sw. m.	8 "	To body	Hewett	French elliptic	4 lead, 1 antimony.
Wm. Fuller	N. Y., L. E. & W.	Heavy diamond	8 "	"	Fletcher	Dupl. elliptic	Lead-lined.
C. H. Burchard	N. Y. C.	Diamond	8 "	To truck	L. S. & M. S. spring	Vose twin grad 4	"
John Kirby	L. S. & M. S.	Rigid diamond 5	8 "	Inside	"	"	"
G. W. Cushing	No. Pac.	Diamond	8 "	"	Hewett	French spiral	Plain bear.
H. L. Cooper	L. E. & W.	Rigid diamond	4 "	Inside	"	Elliptic	Saddle-back.
Sanford Keeler	Fl. & Pere M.	M. C. Thielsen diamond	4 "	"	"	Middleton	Ajax or Hopkins'.
E. B. Wall	P. C. & St. L.	Penna. st'd	6 "	To truck	"	"	"
R. H. Soule	N. Y. W. S. & B.	Diamond	8 "	Inside	Spring lid	Spiral	Phosphor-bronze.*
Reuben Wells	L. & N.	Diamond 7	8 "	"	"	"	"
C. A. Smith	Up. Tank Line	Union sw. m. 8	8 "	Inside	"	Elliptic	Copper and tin.
J. D. Billings	Eastern	Thielsen	8 "	"	"	"	"
John Coghlan	B. R., B. & L.	B. & A. continuous	8 "	To truck	Fletcher	Spiral	"
C. E. Garey	N. Y. C. & H. R.	Iron	8 "	"	M. C. Spring	"	"

* Not brass.

REMARKS.

1. Thos. Sutherland, of C. & G. T. R. R., recommends as springs for 20-ton loads, 7 leaves, $\frac{3}{4}$ x $\frac{3}{4}$ x 24. Prefers 4 x 8 journal.
2. E. A. Olmstead, of N. Y. C. & H. R. R. R., says: "By all means use a 'saddle-back,' and abolish the wedge."
3. W. B. Snow, of Ill. Cen., says: "62" wheel-base, 3 x $\frac{1}{2}$ top bars; 3 x $\frac{1}{2}$ bottom, heeled up at ends, 3 x $\frac{1}{2}$ strap, French's 8 x 7, 2-coil 25-ton spring."
4. "Or Cliff & Righter's triplet spring."
5. John Kirby, of L. S. & M. S. R. R., says: "Top bars $\frac{3}{4}$ x $\frac{1}{2}$; bottom, $\frac{3}{4}$ x $\frac{1}{2}$; strap, $\frac{3}{4}$ x $\frac{1}{2}$; $\frac{1}{2}$ bolts, thin malleable iron washer under head; counter-sunk hole.

6. E. B. Wall, of P. C. & St. L. R. R., says: "The saving depends on the truck adopted, there would be none to the Penna. Co. with a swing-motion truck."
7. Reuben Wells, of L. & N. R. R., says: "No one pattern of truck will answer the requirements. It would be better to select a number of different standards for different loads and uses."
8. C. A. Smith, of Union Tank Line, recommends 6 ft. wheel-base; brake leverage, $\frac{2}{3}$ to 1; arch bars, 4 x $\frac{1}{2}$ top, 2 x 1 bottom, solid continuous frame, B. & A. style.
9. C. E. Garey, of N. Y. C. & H. R., estimates the saving at \$5 per car per year. Favors 4 x 8 journal.

number of interesting letters had been received from various railroad men and car-builders in response to a circular sent out previous to the meeting. We present a tabular extract of the definite recommendations contained in these letters, quite a number of which were read to the meeting previous to the opening of discussion. From 30 to 40 answers were received, all of which agreed that a standard freight-car truck would save a large sum of money (few venturing upon definite figures), that a standard was practicable and desirable (although not all agreed that any one single standard would be expedient, giving no liberty of choice), and that the Master Car-Builders' Association were the proper organization to select such a standard for adoption. The replies were also unanimous in favor of some form of diamond truck, and leaned decidedly toward an all-iron truck. With respect to adopting rigid or swing-motion bolsters there seemed to be considerable difference of opinion. The Fletcher spring box-cover was also much more frequently recommended as a standard than any other in the replies. The Fletcher cover consists of a thin plate pressed against the box by a spiral spring at one side attached to the bolt on which the lid swings. Several of the replies received from well-known men were very emphatic in their preference for this box-cover. The sentiment of the replies was also nearly unanimous in favor of braking on eight wheels. One or two specified the use of trucks on only four wheels for nearly level roads, and one reply proposed to use brakes on each truck separately worked by a brake-shaft at each end of the car. Much difference of opinion appeared in reference to hanging the brakes, whether they should be inside or outside of the wheels and whether they should be attached to the truck or to the car-body. The discussion at the meeting brought out little of general interest in addition to the matter contained in these written replies, as there was evidently more reluctance to express extemporaneous views as freely on a topic of this character and importance as in discussions of less important details.

Mr. MARDEN, of the Fitchburg Railroad, considered that the only feasible way to obtain action would be through an individual or committee of ability who were practical engineers and mechanics, and who should be engaged to travel through the country and get the ideas of different roads, sifting down all the data collected. Mr. Lovell advocated the same idea, and considered the Thielsen truck the best in use, the only objection to it being that it is a patented article. Mr. Garey, of the New York Central, was considered to have substantially as good a truck, without infringing on any patent. The peculiar point on which patent is claimed for the Thielsen truck was stated to be the combination of the channel bars with the iron castings by riveting them together.

Mr. ADAMS, of the Boston & Albany, dwelt at some length upon the importance of the question and the necessity of immediate action. He was also in favor of the appointment of a committee specially engaged to attend to this duty. He considered that the continuous iron frame of the Boston & Albany truck was one containing important merits which it would be well to embody in a standard truck, although he had come upon the Boston & Albany strongly prejudiced against their truck, and still believed that it needed essential modifications in the details, to the general effect of bringing it more into accordance with the diamond type; but he did not think it would be wise to adopt the diamond type as a standard without taking greater precautions than are now usual to keep the truck square, and believed that a continuous frame of some kind should constitute a feature in any standard. He was, however, ready to accede to anything which should meet the views of the majority, for the sake of uniformity.

Mr. LEANDER GAREY, President of the Master Car-Builders' Association, considered that the first things to be determined were the rate of speed and the load which future practice would require. He thought the present committee of the Master Car-Builders' Association might be able to propose a standard if these questions were once settled. He then presented his individual views substantially as in the table below, but more at length.

Mr. ADAMS did not think the question of load was a serious one, as the average freight car did not appear to carry even 20,000 lbs., and if there was necessity to carry 60,000 or 70,000 lbs. on a car, it would be well for roads to have a few cars of extra capacity, which each line might build to suit itself. It was suggested on the other side that this policy might result in the near future in having the same costly confusion in extra heavy cars as now exists in the ordinary type of freight cars, the tendency being more and more toward increasing the capacity.

The meeting finally passed the following resolution: "Resolved, That it is the sense of the members of the

New England Railroad Club that a standard freight car truck be adopted by the Master Car-Builders' Association at as early a date as possible, and that we who are members of that Association will use our best influence in accomplishing that result."

The Club then adjourned till Wednesday, May 28.

THE SCRAP HEAP.

Found What He Wanted.

"I say," said a railroad brakeman running into a depot restaurant, "the forward trucks of my car have slipped off the rails. Have you got a piece of iron anywhere about that we could use for a lever?" "I don't believe I have," replied the proprietor. "What's this?" asked the brakeman, trying to lift something from the counter. "That's sponge cake." "Well, I guess it will do if it isn't too brittle. I will bring it back in a minute."—*Baltimore Day.*

Financial.

The preferred creditor is the one who will wait longest for his pay.—*New Orleans Picayune.*

The preferred stockholder is the one who asks no questions and always sends in his proxy to be voted for the old board.

Income bonds are so called because the holder derives no income from them.

Consolidated mortgage sounds better than third or fourth and general mortgage bonds more attractive than fifth or sixth mortgage securities would be; but the difference is sometimes one that would puzzle a Philadelphia lawyer to find out.

Trust bonds are frequently so called because they require a great amount of trust on the part of the buyer.

Terminal bonds are so called because they are generally issued when a company has reached the terminus of its credit, and the directors are at their wits' end to raise money.

A receiver is a sort of financial undertaker who conducts the funeral of a deceased company, and, like the undertaker, his bill is generally big enough to absorb all the property there is left.

Railroad Thieving.

For some weeks past the Cincinnati, Hamilton & Dayton, the Cincinnati, Washington & Baltimore, the Cincinnati, Indianapolis, St. Louis & Chicago, the Cleveland, Columbus, Cincinnati & Indianapolis and the Ohio & Mississippi railroad companies have been greatly annoyed by a gang of thieves who have been breaking into freight cars, both while in transit and while standing in their respective yards. Freight of every description has been stolen, thereby, in many instances, causing the railroads to be not only greatly inconvenienced, but to lose a considerable sum of money by paying for the missing property. Detectives Amthauer, Adams and Carr were detailed by the different railroads to, if possible, ferret out the thieves and recover the property. The job was an uphill one, but the officers at last succeeded in spotting two men named Charles Willoughby, of No. 695 West Sixth street, and Charles Studer of Sixth street, near Carr. The men had been reported to the officers as the thieves, and their suspicious carriage led to their being taken in last Friday night and locked up at the Third Street Station on suspicion. The prisoners had been frequently seen in the company of Theo. Kline and Charles Ferris, who are partners in a small feed store at the corner of Eighth and Eggleston avenue. The suspicions of the officers were so strong against Willoughby, Ferris and Kline that yesterday morning Detective Amthauer caused search warrants to be issued for Kline & Ferris' store. Armed with the document he and Detective Kushman went to the store in question and there found six butts of tobacco, a sack of coffee, a case of shoes and a quantity of other merchandise, all of which was taken to Central Station. Kline and Ferris were also taken into custody and locked up at Central Station charged with receiving stolen goods. Ferris claimed that he had bought all the goods found from Willoughby. The goods had been represented as parts of different consignments to Willoughby and Kline, and Ferris' wagon had been used to bring them from different points in the suburbs of the city, where they had been thrown from the cars by the thieves. Upon this evidence a charge of grand larceny was placed against Willoughby and Studer. The prisoners are but a very small number of the gang who have been robbing cars for the past six weeks. The mode of operation, which is quite a novel one, was to board a moving train in the suburbs, and, by means of a rope and hook, the thief would be enabled to drop down to the lock on the door of her car. A passenger

pincers soon cut the staple, and an entrance was effected, after which freight such as could be obtained, was thrown out along the road, to be subsequently picked up by pals, the robber himself, eventually jumping from the train and escaping in the darkness that always enveloped the above detailed mode of stealing, which grew to such an alarming extent that it had to be stopped at all hazards. Willoughby was formerly a coal cart driver, and a hard character. A few days ago his wife packed a large box full of dry goods and departed for a place near North Vernon, Ind. Detectives Adams and Carr yesterday went to that point and recovered the goods in Mrs. Willoughby's possession. A dark lantern and the pliers used in cutting the staples on the cars were found in Willoughby's house after his arrest. Ferris was formerly employed as engineer at the Mechanics' Institute, but has more recently been engaged in the feed business. His home is near Kemes, in East Sycamore Township, near Montgomery.—*Cincinnati News-Journal*, April 26.

Train-Wreckers Arrested.

Albert Coleman, aged 18 years, of Staebler street and State avenue, Price Hill, was yesterday morning arrested by Detectives Will Hazen and Jack Hinkle and quartered at Central Station until 2.30 o'clock in the afternoon, when he was taken to Xenia by Hazen. He was arrested on the pretext that he was wanted for using the mails for fraudulent purposes, but he is really suspected of being implicated in the wrecking of the Pan Handle train near Beaver Station, a few miles from Xenia, O., on the night of Friday, April 11, when several persons were killed and a number more or less injured.

An investigation as to the cause of the accident proved that a diabolical plot to wreck the train and rob the express car had been carried out by removing a rail. The suspicion that such was the case was verified when the baggage-master stated that after the catastrophe he was accosted by a man who demanded the keys to the safe, the fellow evidently mistaking him for the express messenger, who was at that time buried in the ruins. Detectives Will and Larry Hazen were put on the case, and started to work with a very frail clue, but by perseverance finally succeeded, when the above arrest of Coleman was made.

Shortly after the wreck, it will be remembered that a man named John Michaels was arrested at Dayton, O., on suspicion of being one of the wreckers, and was subsequently identified by the baggage-master as the man who had demanded the keys of the safe. Michaels was removed to Xenia, and narrowly escaped being lynched. By untiring efforts Detective Hazen finally got a clue to two young men who had bought a quantity of needles from an Eastern house, and had them sent to Middletown, O., where they were received by the two men, who went by assumed names. Of course the goods were not paid for. One of the worthies, who gave the name of Dubbs, was arrested by Larry Hazen in Dayton, O., last Friday, for fraudulently using the mails, and was afterward partially identified as one of the three suspected of wrecking the train. Since Dubbs' arrest, the detectives have been looking for the third man, whom suspicion strongly pointed to as Coleman, who is a telegraph operator. His stepfather, Thomas Jenkins, lives at McLean and Harrison avenues. Coleman could never be caught home, so yesterday morning Will Hazen resolved to resort to a little strategy. A note informing Coleman that he could obtain employment as an operator by applying at the Brighton telegraph office was sent to his sister Rowena Jenkins' house at Staebler and State avenue, Price Hill. Coleman fell into the trap, and when he materialized at Brighton was at once taken into custody. He was not apprised of what he was wanted for, but was taken to Dayton to confront his pals, Dubbs and Michaels.—*Cincinnati News-Journal*, April 29.

TECHNICAL.

Locomotive Building.

H. K. Porter & Co. in Pittsburgh, shipped a light locomotive from their shops last week and have several others under construction.

During the past month there have been gradual reductions made in the force of employees at the Baldwin Locomotive Works of Burnham, Parry, Williams & Co., the total number of discharges to date aggregating about 300 men. The maximum force, when the works are running at their full capacity is upward of 3,000, but this number is now reduced to about 2,700 regular men. The discharges have been made mostly from the smith shop, the foundry and tank room, where the preliminary work in the filling of orders is first completed. More discharges, it is said, must be made during the coming month, as the large falling off in orders will compel a reduction to one-half the producing capacity of the works. The policy of the firm, however, it is said, has always been directed to the best interest of their employees and rather than make wholesale discharges, which would seriously affect so many hundreds of families, a reduction in the working hours will probably be resorted to in order to afford employment to as many of the mechanics as can possibly be retained. The Baldwin Locomotive Works have been engaged to their full capacity for several years past, producing an average number of 12 locomotives per week. The employees of these great industrial shops have been, it is said, singularly fortunate, as there has never been, even in times of greatest business depression, an entire closing down of work. At present the firm has enough orders for locomotives to permit the works to run at one-half their capacity until July 1 next, or an average of about six engines per week, on domestic and foreign accounts. A vessel is now loading with eight locomotives for Rosario, Argentine Republic, and another ship will soon follow for the same port with an equal number. This will make the fifth consignment to the Argentine Republic during the past six months, 42 engines in all, one-third of which were of the narrow-gauge pattern. The first 10 out of an order for 30 locomotives for the Western Railroad of Buenos Ayres are nearly ready for shipment.—*Philadelphia Ledger*, April 26.

The Philadelphia & Reading shops in Reading, Pa., are building four heavy passenger engines for use between New York and Philadelphia.

Car Notes.

The Jackson & Sharp Co. in Wilmington, Del., is building four boudoir cars for the Mann Boudoir Car Co. The shops last week shipped seven new passenger cars to the Rochester & Pittsburgh road.

The Ross Brake Shoe Co. has been organized at East St. Louis, Ill., with \$500,000 capital stock.

The Lehigh Car Manufacturing Co. at Stenton, Pa., has taken a contract to build 150 gondola cars for the Missouri Pacific road.

It is proposed to build car shops at Dover, N. H., and subscriptions amounting to \$25,000 have been secured to the stock.

The Mobile and Ohio shops at Whistler, Ala., are building 200 box cars and 100 coal cars for the road.

The Pullman Car Shops at Pullman, Ill., recently delivered six passenger and eight baggage cars to the Alabama Great

Southern, and 10 passenger cars to the New Orleans & Northeastern road. The freight shops have also completed an order for 1,000 freight cars for the New Orleans & Northeastern road.

Bridge Notes.

The firm of Clarke, Reeves & Co. having been dissolved by mutual consent, a corporation under the name of the Phoenix Bridge Co. has been formed for the purpose of carrying on the business. The officers of the new company are: David Reeves, President; Adolphus Bonzano, Chief Engineer and Vice-President; Wm. H. Reeves, General Superintendent. All of these gentlemen were members of the old firm. The engineering office, shops and works will be, as heretofore, at Phoenixville, Pa., in connection with the works of the Phoenix Iron Co., and the new company will have all the facilities for furnishing bridge work and iron structures that were possessed by the old firm.

Iron Notes.

The Pittsburgh Forge & Iron Co., whose works, by the way, are running double turn—are replacing all their ordinary heating furnaces with the Swindell gas-heating furnaces. The first of these was put in about six months ago, and at the present time six are completed, all of which are in operation. Twelve will be put in altogether. Eight gas-producers supply the fuel for the six furnaces now in operation, and 16 more are in process of construction. The coal used for making the gas is slack of a very inferior quality. The gas is conveyed to the furnaces through an underground flue or tunnel, built of fire-brick. As showing how the work of these furnaces compares with that of the ordinary heating furnace, we learned at the works that not one of the former will heat 22 car axles in 6½ hours, whereas with the latter it requires from 8 to 10 hours to do this. The fact that the company are replacing all their old furnaces after having so thoroughly tested the Swindell furnace may fairly be regarded as convincing evidence that they have complete faith in the superiority of the latter.—*American Manufacturer*.

The changes at the plate mill of the Pottstown Iron Co., Pottstown, Pa., are about completed. The new plate rolls are 112 in. wide; the old ones which they replaced were only 72 in. wide. There are only two mills in the United States with wider rollers than these, one in Pittsburgh and one in Baltimore.

Fanny Furnace, at Sharon, Pa., has gone out of blast for repairs but will resume as soon as they are completed.

The New York Coal, Iron & Coke Co. has filed articles of incorporation, with offices at Johnstown, Pa. The capital stock is fixed at \$3,000,000.

The Greenwood Rolling Mill, at Tamaqua, Pa., has been abandoned and the machinery will be removed.

Manufacturing Notes.

The Sydney Steel Scraper Co. at Sydney, O., was unable to keep up with the orders for both wheel and drag scrapers during the season of 1883, and has been running full force of hands all winter to meet the demands of the trade for 1884.

The Union Brass Manufacturing Co. is putting up a building 28 by 52 feet in size, on Ohio street, in Chicago, to be used for the manufacture of Orme's patent locomotive, marine, relief and lock-up safety valves.

The Rand Drill Co., the Manhattan Mining Co., the Rendrock Powder Co., J. R. Rand & Co., A. C. Rand and N. W. Horton, removed their New York offices from No. 240 Broadway to No. 23 Park Place, May 1.

The Rail Market.

Steel Rails.—Few late sales have been reported and business has been very low and irregular on a somewhat equal market. Some small orders have been placed at \$33 to \$33.50 per ton at mill, but it is said that one large order at least has been placed at \$32. Inquiries for summer delivery are increasing and several large contracts are known to be under negotiation.

Rail Fastenings.—The market continues somewhat unsettled with a light demand. Prices are nominally unchanged at \$2.35 to \$2.50 per 100 lbs. in Pittsburgh for spikes and \$2.75 to \$3 for track-bolts. Splice-bars are quoted at 1.75 to 1.85 cents per pound.

Old Rails.—The market for old iron rails is very quiet and few sales are reported. Quotations are \$22 to \$22.50 per ton at tide-water for tees. A sale of old steel rails is reported in Pittsburgh at \$19 per ton.

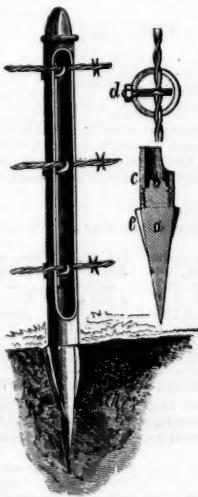
The Baker Car Heater.

The Baker Car Heater Co., of Pittsburgh, is undergoing reorganization and change of title, and will be known in future as "The Standard Car Heating & Ventilating Co." Mr. George Westinghouse, Jr., is the President of the new concern, and Mr. W. T. Taggart the Superintendent. Several modifications are being made in the apparatus, improving its power of ventilating and maintaining an even temperature in railroad cars. Some cars fitted with the latest modifications are now running on local trains on the Pennsylvania Railroad.

Iron Fence Posts.

One of the many designs for iron fence posts, which has certain points of merit, is shown in the accompanying illustration. It is the invention of Mr. E. D. Miner, of Dayton, Wash. Ter.

The construction is evident enough from the illustration itself. The main body of the post, c, is of gas-pipe, about one-half of which is cut away in front and a slot cut down the back. The point, a, is of cast iron with spiral flanges, e, and a driving head, b. The mode of attaching the wire, shown at d, might apparently be simplified, and in large sections of the country it is not likely that metallic posts of any kind will come into use for some time to come, as their cost is from twice to three times greater than wood in the better wooded states; but the superior lightness, convenience of erection, neatness and durability of iron posts will probably give them a large and increasing use.



American Locomotives in Canada.

American locomotives are the subject of a recent editorial in the Toronto (Ont.) *Globe*, which says: "The Kingston *Whig* wants to know how it is that on the one hand the Canadian Pacific bought many American locomotives because they could not wait for Canadian locomotives to be built, while on the other hand the Kingston Locomotive Works have 25 locomotives on hand.

"There is another curious thing about this buying of

American locomotives. As soon as the Canadian Pacific began purchasing American locomotives, the customs department ceased to record in the trade and navigation returns the number of the engines imported. The alleged value is given, but as the number imported is withheld no outsider can tell the price at which these American engines are entered for duty. Up to and including 1881, the number as well as the value of imported locomotives used to be given in the trade and navigation returns. Is there any connection between this and the fact that the locomotives for the Ontario & Quebec are imported by the Canadian Pacific?"

Moving a Bridge.

An interesting piece of engineering work has recently been accomplished at Bristol, England, which consisted in the moving of a foot-bridge 134 ft. in length, bodily, down the river a considerable distance. The pontoons by means of which the bridge was floated to its new position consisted of four 80-ton barges, braced together so as to form one solid structure 64 ft. in width, and were placed in position soon after the tide commenced to rise. At 6 o'clock a. m. the top of the stages, which was 24 ft. above the water, touched the under part of the bridge, and in a quarter of an hour later both ends rose from their foundations. When the tide had risen four feet the stage and bridge were floated to the new position, when at 8.30 the girders dropped on to their beds.

Severe Test of a Steel Rail.

The Scranton Steel Co. exhibits at its New York office, No. 56 Broadway, a specimen of a 70-lb. steel rail, which was subjected to a very severe test. A ball weighing 2,240 pounds was dropped 55 ft. on this rail, which rested on bearings 3 ft. apart. Though the rail bent under this heavy blow, there is not the sign of a flaw about it. The carbon in this rail is 0.37 per cent. The usual rail test is a ton weight dropped 17 ft. A comparison of such a test with the one actually made will show the unusual strength of the Scranton rail.—*Iron Age*.

The New British Patent Act.

The essential features of this new act, which went into effect with the present year, are that inventions are subject to examination for novelty, and issue only to inventors or an inventor and capitalist jointly. Two months are allowed for "interference" proceedings on the grounds of lack of novelty or fraud. Licenses can be compelled to be granted at rates fixed by the Board of Trade in case it can be shown that the patent is not being worked or that public or private interests are suffering.

The fees fixed are:

Stamp fee for examination.....	£3
After four years.....	£50
After seven years.....	£100

the last payment renewing the patent for seven years longer, or fourteen years in all.

Boston & Albany Locomotives.

The compound locomotive, No. 100, on the Boston & Albany road is doing satisfactory regular freight service between this city and Worcester. It did not make the saving in fuel expected as a compounder, so the pistons were recently taken from the small cylinders and the valves stopped. Now it operates precisely like No. 74, and with equally good results. The patentee of the compound locomotive in this country, Henry D. Dunbar of Vermont, is now in South America, and when he returns some changes will be made in the engine so that it may the better realize his ideas. Mr. Dunbar went out as agent for the Baldwin Locomotive Works to set up six machines for the Central Northern Railroad in the Argentine Republic. By the time this work was done eight more were sent to him, and now he writes that 27 more are ordered and he must stay some months to see them in good running order. Meanwhile the expediency of compounding locomotives is being pretty thoroughly talked up. The aim of all improvements in engines nowadays is toward economy in fuel without sacrificing power. In marine engines this aim is accomplished by using the steam twice at low pressure. Mr. Dunbar undertook to carry out this plan in his trial locomotive by fitting it with two large and two small cylinders. On a road with no heavy grades the engine compounded easily, and burned less coal than other engines which did the same work. But on the route where it is now running the grades are so heavy that the compounding arrangement is useless.

Of all the new and old-fashioned locomotives which have been tried on the Boston & Albany road, none have succeeded so well as those made here from the plans of A. B. Underhill, Superintendent of Motive Power. "No engine made," said Mr. Westinghouse, inventor of the Westinghouse air-brake and engine, in Boston the other day, "will do so much work with such economy of fuel as the Boston & Albany locomotives of the Underhill pattern." Mr. Underhill's idea, worked out in these machines, is simply that steam at high pressure will do more work than at low pressure with the same consumption of fuel. His high pressure locomotives have already become so famous, although but 11 are yet made, that the Pennsylvania Railroad Co. is expected soon to send here one of its officials to see how well the engines work. It has been recently suggested that Mr. Underhill's scheme of construction could be made to work admirably on marine engines, although condensing in a tight box is quite different from condensing in the air.—*Springfield Republican*, April 27.

Effectiveness of Coal in Locomotives.

We published under this head in our issue of March 14 last a summary of some interesting French experiments, which showed the following results:

Coal burned per I. H. P. per hour.....	2.88 lbs.
effective H. P.	3.27 lbs.

Other trials were also summarized, showing approximately similar results with express engines.

Against this may be compared the duty obtained from existing pumping engines of our various cities, as given in a paper by Mr. E. H. Martin, Chief Engineer of the Cleveland Rolling Mill Co., as follows: We transform the duties given in foot-pounds into equivalent pounds of coal per effective horse power per hour.

Lbs. per H. P. per hour.	Lbs. per H. P. per hour.
Buffalo.....	4.33
Cleveland.....	4.77
Columbus.....	3.88
Philadelphia.....	4.33
Providence (Corliss).....	1.81
Brooklyn.....	3.80
Average.....	3.60

As against similar results with locomotive tests..... 3.27

The latter tests, of course, were made under exceptionally favorable conditions of locomotive working, being so slightly loaded as to be able to handle their trains on a very heavy grade when cutting off at ½ stroke and, no doubt, in perfect order in all respects. Nevertheless, the contrast is curious, and seems to lend much support to Mr. Martin's charge that pumping engines have advanced but little beyond those of 40 years ago, when 125,000,000 foot-pounds per 94 lbs. of coal (1.50 lbs. per H. P. per hour) is claimed to have been authentically shown in a 30-hour test.

A Small Steam Engine.

Many will remember the small oscillating engines which had a great sale as toys some years ago at a dollar each; but probably the smallest steam engine ever made for actual use is that shown in a recent issue of the *Iron Trade Review*. It was made to perforate paper patterns, and was only $\frac{1}{2}$ in. bore by $\frac{1}{2}$ stroke, making about 3,000 strokes per minute with five pounds of steam.

Telpherage.

Professor Fleeming Jenkin, of Edinburgh, lately delivered a lecture on the subject of "Telpherage; or, The Automatic Transport of Goods by Electrical Means," Sir William Thomson, F. R. S., in the chair. The lecturer exhibited for the first time publicly a large working model railway, illustrating the new means of transport, which, in conjunction with Professors Ayrton and Perry, he has now fairly developed. The model railway consisted of two circular lines of wires of ten or twelve yards in circumference, carried by wooden posts erected on the lecture platform, the wires being stretched between the posts after the fashion of telegraph wires. Each line carried a model train provided with electrometers which served as locomotives and several rounds of the railway were run by passing a current through the wires from a few batteries. By means of the model Professor Jenkin explained how he proposed to carry out his invention on a large scale. The line he proposed to divide into short lengths, terminating with each supporting post or frame, the alternate lengths being so arranged that the current passing through the wires should be positive in one length and negative in the adjacent lengths. The train comprised, in addition to the motor, a number of bucket-like wagons suspended from wheeled frames running on the wires, the length of each train being somewhat greater than the stretch of wire between each post, the object of this arrangement being to complete the circuit through the alternate positive and negative wire by means of the train itself, and to insure the passing of the current through the motor. The motor itself was suspended from a wheel frame on the wires, and was fitted to drive an arrangement of grooved pulleys, which gripped the wire on each side while rotating, the power being transmitted through "nest gearing" to avoid friction on the pulley spindles. After minutely describing his invention, and referring to the difficulties he had met with in endeavoring to make it a practical success, Professor Jenkin entered into an elaborate discussion of the cost of erecting and maintaining "telpher" lines as against the cost of cartage on common roads, the telpher train being destined, in his opinion, to take the place of the horse and cart and serve rather as a feeder than as a competitor of the railway system. A telpher line of $\frac{1}{2}$ in. steel rods carried on wooden posts and properly insulated, he estimated, would cost no more than £500 per mile. He would put down £1,500 per annum for engine power for a 25-mile line. The cost of transport on such a line, working eight hours a day, after making full allowance for interest on capital, for depreciation, wages, etc., should not, the lecturer stated, exceed $\frac{1}{4}$ d. per ton per mile, a result which compares most favorably with cartage.—*Mechanical World*.

Railroad Ties.

"I saw," said a contractor who handles a large number of ties in this locality annually, "that the *Herald* recently predicted that the time was approaching when red-wood ties would have to be used on railroads. I am not in favor of red-wood. While out West two or three years ago I examined this red-wood and was convinced that it was too soft. In time a rail cuts down into even an oak tie and a spike draws out of it, hence you can see that it would be an objectionable wood. Georgia pine, which is much harder than other varieties of pine, is preferable to red-wood by far. Of course if all the ties being laid were of oak the supply of that timber would soon give out. It ought at the present rate of consumption to last several years, however. The Nickel Plate is laid with many beech and maple ties. Beech is by no means a poor wood for railway sleepers."—*Cleveland Herald*.

ANNUAL REPORTS.

The following is an index to the annual reports of railroad companies which have been reviewed in previous numbers of the current volume of the *Railroad Gazette*:

Page.	Page.
Atchafalpa, Top. & Santa Fe. 64	N. Y., N. Haven & Hartford. 27
Camden & Atlantic. 105	N. Y., Ontario & Western. 106
Charlotte, Col. & Augusta. 232	N. Y., Pennsylvania & Ohio. 139
Chicago & Alton. 140	N. Y., Susquehanna & West. 147
Chi. Burlington & Quincy. 259	Norfolk & Western. 260
Chi. Milwaukee & St. Paul. 87	Norfolk Central. 106
Chi. New Orleans & Tex. Pa. 164	Pennsylvania & New York. 140
Chi., Wash. & Baltimore. 46	Pennsylvania Railroad. 181
Cleveland, Col. & Ind. 278	Perkiomen. 87
Cleveland & Pittsburgh. 46	Petersburg & Reading. 27
Columbia & Greenville. 87	Philadelphia, W. & Balt. 106
Columbus, Hocking V. & Tol. 202	Pittsburgh & Castle Shannon. 104
Connecticut River. 94	Pittsburgh & Lake Erie. 47
Consolidation Coal Co. 321	Pittsburgh, Dick & Young. 83
Cumberland Valley. 259	Portland & Ogdensburg. 87
Deia. & Hud. Canal Co. 140	Portland & Rochester. 107
Delaware, Lacka. & Western. 165	Providence & Worcester. 64
Denver & Rio Grande. 290	Richmond & Danville. 35
Fitchburg. 47	Rochester & Pittsburgh. 241
Hartford & Conn. Western. 165	St. L. & San Francisco. 297
Housatonic. 106	St. Louis & Vandalia. 196
Houston & Texas Central. 241	St. Paul & Duluth. 147
Huntingdon & Broad Top Mt. 107	Sandy River. 87
Illinois Central. 164	South Carolina. 105
Kentucky Central. 279	Texas & Pacific. 195
Knox & Lincoln. 87	Troy & Greenfield. 106
Lehigh Coal & Navigation. 147	Union Pacific. 185
Lehigh Valley. 47	Utica & Black River. 87
Mexican Central. 279	Western Maryland. 8
Milwaukee, Lake Sh. & West. 279	West Jersey. 87
Mississippi & Tennessee. 8	West Va. Central & Pittsburgh. 48
Missouri Pacific. 26	Wilmington, Col. & Augusta. 8
New Haven & Northampton. 147	Wilmington & Weidon. 9
N. Y., Lake Erie & Western. 331	

Savannah, Florida & Western.

This company owns and operates 473.6 miles of road, including lines from Savannah, Ga., to Bainbridge, 236.8 miles; from Waycross, Ga., to Jacksonville, Fla., 76.2; Dupont, Ga., to Rowland's Bluff, Fla., 72.9; Thomasville, Ga., to Albany, 58.1; Climax, Ga., to Chattahoochee, Fla., 24.1; the wharf extension in Savannah, 1.4, and the Junction Branch near Savannah, 4.1 miles. The Chattahoochee Branch was built last year.

The following statements for the year ending Dec. 31 last are furnished by the company.

The equipment consists of 60 locomotives; 33 passenger and 20 mail, baggage, smoking and express cars; 895 freight cars.

The general balance sheet, in brief, is as follows:

Liabilities:	
Capital stock	\$2,331,800.00
Funded debt	2,705,000.00
Bills payable	31,999.92
Interest on funded debt unpaid	74,657.50
Open accounts	325,067.33
Current expenses	185,119.23
Dividends unpaid	151,668.00
Profit and loss, credit balance	3,520.85
Total	\$5,849,432.80

Assets:	
Railroad and appurtenances	\$5,396,784.28
Due by agents and conductors	180,484.76
U. S. Post Office Dep't.	14,437.20
Others	126,488.20
Supplies on hand	81,369.87
Cash	49,868.49
Total	\$5,849,432.80

The capital stock was increased \$322,800 during the year. There was no change in the bonded debt.

The traffic for the year was as follows:

	1883.	1882.	Inc. or Dec.	P. c.
Train-miles	1,332,204	1,020,484	I.	311,720 30.6
Passengers carried	352,070	269,210	I.	82,860 30.8
Passenger-miles	20,842,466	15,009,056	I.	5,833,410 38.9
To a freight carried	560,708	437,263	I.	123,445 28.2
Ton-miles	31,506,092	48,531,117	D.	17,025,025 35.1

The average passenger journey last year was 59.2 miles; the average freight haul was 56.2 miles.

There was a large increase in passenger traffic, but a falling off in freight, the ton-mileage showing a decrease, although there was a gain in tons carried.

The earnings for the year were as follows:

	1883.	1882.	Inc. or Dec.	P. c.
Freight	\$1,170,290	\$925,079	I.	\$245,211 27.2
Passage	604,883	378,968	I.	225,915 59.6
Mail service	52,717	40,963	I.	11,754 28.7
Other sources	309,237	330,807	D.	21,570 6.5
Total	\$2,143,136	\$1,675,817	I.	\$467,319 27.9
Expenses	1,768,734	1,317,054	I.	449,680 34.1

	1883.	1882.	Inc. or Dec.	P. c.
Net earnings	\$376,402	\$358,763	I.	\$17,639 5.0
Gross earn. per mile	4.639	3.925	I.	714 18.3
Net	815	840	D.	25 3.0
Per cent. of expenses	82.44	78.00	I.	4.44

The large increase in earnings over the previous year was very nearly equalled by that in expenses, leaving but a small gain in net earnings.

Payments from net earnings were as follows:

	1883.	1882.	Inc. or Dec.	P. c.
Net earnings	\$376,402	\$358,763	I.	\$17,639 5.0
Interest	\$231,331.32	\$231,331.32		
Dividends	93,272.00	93,272.00		
to leased lines	58,396.00	58,396.00		
Other payments	6,568.89	6,568.89		
Total	\$380,568.21	\$380,568.21		

Excess of payments \$13,160.18

The dividends for the year were 4 per cent. upon the stock. The leased lines (which are practically owned by this company and include the lines from Waycross to Jacksonville, and from Live Oak to Rowland's Bluff) receive the same dividends on their stock as are paid on that of the company.

Missouri Pacific.

At the close of its last fiscal year, Dec. 31, 1883, this company worked the following lines held either by ownership or lease:

	Main track.	Sidings.
Missouri Pacific	900	213
Central Branch, Union Pacific	358	34
Missouri, Kansas & Texas	1,386	136
International & Great Northern	775	75
Galveston, Houston & Henderson	50	24
Texas & Pacific	1,487	122
St. Louis, Iron Mountain & Southern	905	208
Total Missouri Pacific	5,981	812
Wabash, St. Louis & Pacific	3,566	
Total	9,547	

Additions during the year were 12 miles of branches on the Missouri, Kansas & Texas and 23 miles on the St. Louis, Iron Mountain & Southern, and the Galveston, Houston & Henderson road, acquired under lease. The Wabash shows an increase of 48 miles, not from new construction, but from readjustments of mileage.

The equipment of the roads worked is as follows:

	Loco-motives.	Pas. train cars.	Freight cars.	Service cars.
Mo. Pacific	155	114	4,726	28
Central Br.	30	25	569	9
Mo., Kan. & Tex.	161	80	4,115	15
Int. & Gt. No.	74	55	1,477	42
Galveston, H. & H.	13	18	171	22
Texas & Pacific	165	100	2,847	75
St. L., I. M. & So.	138	105	4,692	23
Total	738	501	18,597	214
Wabash, St. L. & P.	600	370	19,695	
Total	1,338	871	38,292	214

Additional to the equipment and cars held under car trusts are noted below. The total number in use is 1,338 locomotives and 39,297 cars of all classes.

The general account of the Missouri Pacific is as follows:

	1883.	1882.	Inc. or Dec.	P. c.
Stock (including exchanges for Iron Mountain stock)	\$29,062,125.00	\$29,062,125.00		
Funded debt	26,895,000.00	26,895,000.00		
Interest due and accrued	496,433.32	496,433.32		
December vouchers, payable in January	2,430,551.99	2,430,551.99		
St. Louis Bridge & Tunnel Co., surplus earnings	57,000.00	57,000.00		
Hospital fund	65,911.45	65,911.45		
Balance of income account, Dec. 31, 1883	5,094,563.39	5,094,563.39		
Total	\$64,971,684.25	\$64,971,684.25		

Road and equipment \$39,950,939.11

Investments in stocks and bonds 22,324,316.02

Supplies and materials on hand 1,185,717.92

Balances, uncollected earnings, etc. 731,661.18

Cash on hand 779,050.02

The funded debt includes \$7,000,000 first-mortgage bonds; \$2,573,000 second-mortgage bonds; \$800,000 real estate bonds; \$700,000 St. Louis County loan; 3,828,000 third mortgage bonds; \$1,294,000 bonds of various issues, first mortgages on branches, and \$10,700,000 consolidated mortgage bonds.

TRAFFIC.

The train mileage of the various roads was as follows:

	Pas. train.	Freight train.	Total.
Mo. Pacific	1,584,709	3,092,470	4,677,179
Central Br.	305,081	615,701	920,782
Mo., Kan. & Tex.	1,384,154	4,444,045	5,828,199
Int. & Gt. No.	812,105	1,655,226	2,467,331
Gal. H. & H.	126,373	204,117	330,490
Texas & Pac.	1,276,702	3,817,816	5,094,518
St. L., I. M. & So.	1,293,607	3,391,941	4,685,548
Total	6,762,701	18,121,322	24,884,023

For the six months reported the Wabash, St. Louis & Pacific road shows 2,357,048 passenger train miles, 5,024,356 freight train miles, and a total locomotive movement of 9,613,303 miles.

The total mileage of passenger and freight cars was as follows:

	Pas. train cars.	Freight cars.	Total.
Mo. Pacific	6,891,843	56,081,004	62,972,847
Central Br.	990,138	65,248,713	66,238,851
Mo., Kan. & Tex.	6,385,299	21,629,596	28,014,895
Int. & Gt. No.	3,465,602	2,007,799	5,473,401
Gal. H. & H.	581,696	42,763,847	43,345,543
Texas & Pac.	6,083,503	52,689,734	58,773,237
St. L., I. M. & So.	6,925,404		6,925,404
Total	31,423,685	247,565,674	278,989,359

On the Wabash, St. Louis & Pacific for the half year pas-

senger-train cars ran 11,754,505 miles and freight cars 102,940,840 miles.

The traffic carried on all the lines was as follows:

	1883.	1882.	Inc. or Dec.	P. c.
Passengers carried:				
Mo. Pacific	1,567,683	1,472,311	I.	95,372 6.5
Central Br.	164,743	145,084	I.	19,659 13.6
Mo., Kan. & Tex.	793,808	557,035	I.	236,773 42.5
Int. & Gt. No.	492,172	250,817	I.	241,355 96.2
Gal. H. & H.	91,195			
Texas & Pacific	744,745	392,765	I.	351,980 81.4
St. L., I. M. & So.	1,028,043	955,787	I.	72,256 7.6
Total	4,883,290	3,773,390	I.	1,109,900 29.4

Tons freight carried:

	1883.	1882.	Inc. or Dec.	P. c.
Mo. Pacific	3,270,721	3,194,353	I.	76,368 2.4
Central Br.	371,556	317,434	I.	54,122 17.1
Mo., Kan. & Tex.	2,130,894	1,655,103	I.	475,791 28.7
Int. & Gt. No.	593,452	486,585	I.	106,867 21.9
Gal. H. & H.	189,190			
Texas & Pacific	946,219	1,040,262	D.	94,043 9.9
St. L., I. M. & So.	1,557,954	1,500,491	I.	57,463 3.8
Total	9,059,986	8,203,228	I.	856,758 10.4

The Galveston, Houston & Henderson was not worked by this company in 1882. The Texas & Pacific is the only line showing a decrease in traffic carried. A notable point is the decrease in the average passenger journey and the increase in the average freight haul.

The traffic of the Wabash, St. Louis & Pacific for the six months reported was:

	1883.	1882.	Inc. or Dec.	P. c.
Passengers carried	2,076,240	2,281,970	D.	205,730 9.0
Average journey	40.1 miles	40.7 miles	D.	0.6 mile 1.5
Tons freight carried	3,425,141	3,205,923	I.	219,218 6.8
Average haul	213.7 miles	221.4 miles	D.	7.7 miles 3.4

This road shows a decrease in passenger business, while the freight traffic was very nearly the same.

The traffic of the whole Missouri Pacific system, excluding the Wabash, was as follows:

	1883.	1882.	Inc. or Dec.	P. c.
Pass. train miles	6,762,701	5,890,105	I.	872,596 14.8
Freight train miles	18,121,322	11,088,965	I.	7,032,357 63.4
Passengers carried	4,883,290	3,773,390	I.	1,109,900 29.4
Passenger-miles	292,509,011	238,478,817	I.	54,030,194 22.2
Tons freight carried	9,059,986	8,203,228	I.	856,758 10.4
Ton-miles	2,143,592,088	1,432,306,830	I.	711,285,258 49.7

Av. train load:

	1883.	1882.	Inc. or Dec.	P. c.
Passengers, No.	43	45	D.	2 4.3
Freight, tons	118	129	D.	11 8.5

This statement shows a great increase in the total traffic on a very slight increase in mileage worked.

EARNINGS.

The earnings of the Missouri Pacific proper, 990 miles, were:

Freight train miles.....	18,121,322	11,088,965	I.	7,032,357	63.4
Passengers carried.....	4,883,269	3,773,399	I.	1,109,890	29.4
Passenger- miles.....	292,509,011	238,478,817	I.	54,030,194	22.2
Tons freight					

and the Iron Mountain, show a considerable gain in net earnings, while all of them have an increase in gross earnings. The Galveston, Houston & Henderson was not operated in 1882.

The earnings of the Wabash, St. Louis & Pacific for the six months reported were:

	1883.	1882.	Inc. or Dec.	P. c.
Earnings.....	\$9,531,513	\$9,440,351	I. \$91,162	0.9
Expenses.....	6,704,752	6,500,933	I. 203,819	3.1
Net earnings.....	\$2,826,761	\$2,939,418	D. \$112,657	3.8
Gross earn. per mile.....	2,673	2,683	D. 10	0.4
Net.....	793	836	D. 43	5.1
Per cent. of expenses.....	70.34	68.86	I. 1.48	

There was expended on this road for improvements the sum of \$193,124, in addition to the improvements made and included in working expenses.

The income account of the Missouri Pacific Co. is as follows:

Net earnings, as above.....	\$4,175,206.00
Dividends, etc., received.....	439,660.66
Total.....	\$4,614,866.66
Interest on bonds.....	\$1,067,880.00
Taxes, rentals, dividends, etc.....	2,512,375.43
Carondelet Ferry.....	5,269.79
Total.....	4,185,525.22

Surplus for the year..... \$429,401.44

Balance, Jan. 1, 1883..... 4,635,101.95

Balance, Jan. 1, 1884..... \$5,064,563.39

Dividends amounting to 7 per cent. for the year were paid upon the stock.

LAND DEPARTMENT.

Some statistics of the Land Department are given as follows for the year:

	M., K. & T.	Iron Mt. in Mo.	Iron Mt. in Ark.	Tex. & Pac.
Sales, acres.....	32,750	4,150	66,840	205,693
" amount.....	\$78,281	\$15,700	\$195,988	\$840,007
Cash received.....	112,240	17,730	171,880	135,380
Land notes held.....	250,789	27,013	701,554	217,802
Acres unsold.....	5,500	115,644	928,498	4,523,349

The report says: "The operations in this department during the year exhibit very satisfactory results, especially in the states of Arkansas and Texas. In the latter state nearly three times more land was sold in 1883 than in the previous year, and at an average price more than 40 per cent. higher than the sales of 1882.

"By means of experimental farms and the operations of actual settlers it has been demonstrated that large areas of land west of Fort Worth, Texas, which have hitherto been considered adapted only to grazing purposes, are capable of producing excellent farm crops. Special facilities are being offered by the railway companies by means of monthly excursions to parties prospecting for lands, and the increasing demand for investments, both from immigrants and capitalists, indicates the early disposition of the entire holdings of the companies."

GENERAL REMARKS.

The report of Vice-President R. S. Hayes says: "Commencing Jan. 1, 1883, the Galveston, Houston & Henderson Railroad has been operated as a part of the International & Great Northern Railroad, under its lease to that company for 99 years. No new construction has been done except to complete the branches in progress at the close of the previous year, viz: the Trinity & Sabine Railway, completed to Ogdin, Texas, 12 miles; White River Branch, St. Louis, Iron Mountain & Southern Railway, completed to Batesville, Arkansas, 13 miles; Doniphan Branch, St. Louis, Iron Mountain & Southern Railway, completed to Doniphan, Mo., 10 miles; total newly constructed mileage, 25 miles.

"On April 10, 1883, the Wabash, St. Louis & Pacific Railway was leased to the St. Louis, Iron Mountain & Southern Railway Co., and has been operated since that date in connection with the Missouri Pacific system. Its operations for the six months only, from July 1 to Dec. 31, 1883, are included in this report, as the practical economies and measures for its more profitable operation, adopted subsequent to the lease, can only be said to have taken effect during the period named.

"There have been added to the equipment of the Missouri Pacific lines during the year, 47 locomotives, 32 passenger cars, 16 baggage, mail and express cars, and 538 freight cars. The equipment included the following, furnished by car trusts:

"The I. & G. N. Car Trust, 200 flat cars. Unpaid balance Dec. 31, 1883, \$44,874. Iron Mountain Car Trust, 30 locomotives, 18 passenger, baggage, mail and express cars; 1,900 freight cars, 100 refrigerator cars. Unpaid balance Dec. 31, 1883, \$881,000. New York & Pacific Car Trust (equipment furnished to the W., St. L. & P. Ry.), 113 engines, 64 passenger, baggage, mail and express cars; 6,350 freight cars, 100 refrigerator cars. Unpaid balance Dec. 31, 1883, \$3,196,000. The last payment of \$14,000 on trust cars of the Eel River Division W., St. L. & P. Ry. was made during the past year, and the cars (350) have become the property of the company.

"The equipment of transfer, ferry and steamboats includes 7 ferry steamers and 4 Wabash lake line steamers.

"All the roads show an increase in gross earnings over the previous year, and as the operated mileage has been only slightly increased the result indicates a substantial growth in the earning capacity of the properties. The total operating expenses of the Missouri Pacific lines, including the cost of all improvements and betterments, show a smaller percentage, and the surplus earnings a larger percentage, of increase than the gross earnings.

"Rates have been well maintained, both on passengers and freight, except in the states of Kansas and Arkansas. Through the action of the State Board of Railroad Commissioners of Kansas the rates upon freight in that state were reduced in the month of November an average of about 20 per cent.; although advised by eminent legal authority that the legality of this action was very doubtful, and counseled to test the same in the courts, the company decided, after presenting to the Commissioners statistics showing the injustice of such reduction, to comply with their rulings, believing that the public sentiment of the state will eventually correct the wrong. All new construction in Kansas has, under the circumstances, been indefinitely suspended. In the state of Arkansas, commencing Oct. 1, 1883, passenger rates have been reduced to 3 cents per mile upon the St. Louis, Iron Mountain & Southern Railway, which has had the effect upon some portions of the road to diminish passenger receipts, but with the development of the country the earnings at the rate established, which is uniform with that in the other states reached by our lines, are expected to increase. Extensive additions both to locomotive and car equipment are necessary; the movement of cotton on the southern lines was earlier and more concentrated than usual, and taxed the roads beyond their capacity to promptly handle, although every effort was made to supply the deficiency by transferring engines and cars from other portions of the system, and these circumstances have given occasion for criticism which should not be permitted again to occur. The tonnage

of coal carried from mines in Illinois, Missouri, Indian Territory and Texas, shows a considerable increase, and as this traffic promises to develop largely in the future proper equipment should be provided for its transportation.

"The bridge over the Atchafalaya on the New Orleans Division of the Texas & Pacific Railway was completed Dec. 26, 1883. The difficulties encountered in the work were extraordinary and delayed the completion of the structure beyond the time expected, but were finally overcome by the persistent labor of skilled engineers. This important division of the system was, therefore, operated under great disadvantages during almost the entire year, notwithstanding which the net earnings of the Texas & Pacific road were considerably increased. The road-bed of the New Orleans Division has been raised, ballasted and improved during the year, and with the increased facilities afforded by the bridge, it is expected that a material increase of revenue will be effected."

Income accounts and balance sheets are given below for the several lines, excepting the Galveston, Houston & Henderson and the Central Branch, for which these statements are not given in the report. The Central Branch is operated by this company for account of its owner, the Union Pacific Co.

MISSOURI, KANSAS & TEXAS.

The general account of this company is as follows:

Preferred stock.....	\$12,567
Common stock.....	46,405,000
Funded debt.....	41,560,500
Interest due and accrued.....	1,477,977
Land Department, net proceeds of operations.....	806,676
Miscellaneous accounts.....	14,572
Total.....	\$90,367,382
Road and equipment.....	\$98,448,676
Investments in stocks and bonds.....	18,484,410
Cash and accounts receivable.....	1,523,512
Income account, balance.....	3,910,784
Total.....	90,367,382

The stock remained unchanged, but the bonded debt increased \$846,873 during the year. It consists of \$3,757,000 divisional bonds, \$1,182,000 Fort Smith Branch bonds, \$13,588,000 consolidated bonds, \$7,195,000 second-mortgage income bonds, \$2,701,600 coupon scrip, etc., and \$13,137,000 general consolidated mortgage bonds.

The income account was as follows:

Net earnings, as above.....	\$3,197,008
Other receipts.....	146,207
Total.....	\$3,343,215
Interest paid.....	\$2,492,517
Rentals, etc.....	479,200
Total.....	2,971,717

Surplus for the year..... \$381,498

Debit balance, Jan. 1, 1883..... 4,282,282

Debit balance, Dec. 31..... \$3,910,784

The surplus for 1883 compares with a deficit of \$97,642 for the previous year's operations.

INTERNATIONAL & GREAT NORTHERN.

This company's general statement is as follows:

Stock.....	\$9,755,000
Funded debt.....	15,008,000
Interest due and accrued.....	247,071
Accounts and balances.....	47,412
Income account, balance.....	3,064,783
Total.....	\$28,122,266
Road and equipment.....	\$27,867,110
Stocks and bonds.....	250,493
Cash.....	4,663
Total.....	28,122,266

The bonded debt was not changed during the year; it includes \$7,954,000 first and \$7,054,000 second-mortgage bonds.

The income account was as follows:

Net earnings for the year.....	\$954,252
Dividends, etc., received.....	34,657
Total.....	\$988,909
Interest on bonds.....	\$908,785
Taxes and sundry accounts.....	116,417
Total.....	1,025,202

Deficit for the year..... \$30,293

Balance, Jan. 1, 1883..... 3,101,076

Balance, Dec. 31, 1883..... \$3,064,783

The deficit last year compares with one of \$111,374 for the previous year.

ST. LOUIS, IRON MOUNTAIN & SOUTHERN.

The general account of this company is as follows:

Stock.....	\$22,083,865
Funded debt.....	35,319,299
Interest due and accrued.....	867,139
Sundry accounts and balances.....	1,799,940
Income account, balance.....	836,573
Total.....	\$61,006,816
Cost of road and equipment.....	\$52,705,985
Investments in stocks and bonds.....	5,240,668
Land and land loans.....	3,022,599
Advances account surveys.....	37,564
Total.....	\$61,006,816

The stock is all held by the Missouri Pacific Co. The bonded debt was increased by \$1,389,898 during the year.

The income account for the year was as follows:

Net earnings for the year.....	\$3,690,120
Interest received, pool earnings, etc.....	95,054
Total.....	\$3,785,174
Interest on bonds.....	\$2,250,193
Taxes.....	121,936
Discount, bridge and car trusts, etc.....	357,550
Total.....	2,738,679

Surplus for the year..... \$1,046,495

Debit balance, Jan. 1, 1883..... 109,922

Credit balance, Dec. 31, 1883..... \$936,573

For the previous year there was a surplus of \$1,089,871 over all charges.

TEXAS & PACIFIC.

The general statement of this company is as follows:

Stock.....	\$32,161,900
Funded debt.....	41,714,000
Texas school fund loan.....	169,335
Scrip redeemable in lands or stock.....	2,134,051
Interest due and accrued.....	678,035
Total.....	\$76,857,921
Road and equipment.....	\$62,404,552
Investment in stocks and bonds.....	7,536,720
Sinking fund.....	95,201
Interest scrip issued.....	4,110,411
Advances, account surveys.....	24,844
Cash and accounts receivable.....	646,057
Income account, balance.....	2,040,136
Total.....	76,857,921

The funded debt is unchanged; it consists of \$3,874,000 Eastern Division first and \$9,226,000 consolidated bonds; \$13,028,000 Rio Grande Division bonds; \$6,720,000 New Orleans Pacific bonds; \$3,857,000 income and land grant and \$9,000 old land grant bonds.

The income account was as follows:

Net earnings for the year.....	\$1,048,007
Rentals, interest, etc.....	228,853
Land sales.....	163,938
Total.....	\$2,040,798
Interest.....	\$1,070,085
Taxes.....	189,417
Rentals.....	54,900
Total.....	2,214,402

Deficit for the year..... \$173,604

Debit balance, Jan. 1, 1883..... 1,866,532

Debit balance, Dec. 31, 1883..... \$2,040,136

No statement of income was given for this road in 1882, and no comparisons can be made.

WABASH, ST. LOUIS & PACIFIC.

The general account, condensed, is as follows:

Common stock.....	\$27,337,900
Preferred stock.....	23,034,300
Funded debt.....	76,466,078
Interest due and accrued.....	1,544,836
Notes and loans payable.....	2,773,516
Accounts and balances, less cash on hand.....	509,010
Total.....	\$131,664,838
Road and equipment.....	\$117,625,083
Investments in stocks and bonds.....	9,365,677
Materials on hand.....	900,494
Income account, balance.....	4,073,584
Total.....	131,664,838

This company, it will be noted, is carrying a considerable floating debt.

The income account is as follows for the six months covered by the report from July 1 to Dec. 31 last:

Net earnings, six months.....	\$2,826,761
Dividends received.....	128,190
Sundry accounts.....	245,196
Total.....	\$3,200,147
Interest on bonds.....	\$2,204,545
Taxes.....	140,062
Rentals.....	567,235
Sundry accounts paid.....	188,534
Total.....	3,119,396

Surplus for the six months..... \$89,751

Debit balance, Jan. 1, 1883..... 4,163,335

Debit balance, Dec. 31..... \$4,073,584

The net earnings were \$283,635 less than the fixed charges, the balance being made up from the miscellaneous receipts.

Central Pacific.

The following statement for 1883 has been submitted to the California Railroad Commissioners by General Manager A. N. Towne: "I have the honor to transmit herewith, in accordance with the form prescribed by your Honorable Board, the report of the Central Pacific Railroad Co. for the year ending Dec. 31, 1883, which is subscribed and sworn to by the designated officers of the company. The general results from the operations of the Central Pacific Railroad Co. and its leased lines for the year 1883, compared with the previous years reported to your Honorable Board are shown as follows:

TABLE OF EARNINGS.

	1881.	1882.	1883.
Total earnings.....	\$24,004,101	\$25,662,757	\$24,744,421
Income from all other sources.....	1,295,156	1,012,745	938,860
Totals.....	\$25,389,257	\$26,675,502	\$25,683,281
Expenses of operating.....	\$14,570,428	\$17,101,767	\$16,672,771
Interest paid on debt.....	3,508,292	3,443,414	3,546,591
Paid U. S. and Sinking Fund.....	2,407,780	2,538,680	2,337,625
Totals.....	\$20,486,500	\$23,083,860	\$22,656,987
New construction, improvements, etc.....	\$350,627	\$1,549,110	\$2,160,808
Average passenger rate per mile.....	3.06 cts.	2.92 cts.	2.73 cts.
Average freight rate per ton, freight, per ton.....	2.16 "	1.81 "	"

It will be seen that the total payments from income for the past three years have been for 1881, \$20,495,500; for 1882, \$23,083,860; for 1883, \$22,556,987; total, \$66,136,347.

"In addition to this the Central Pacific Railroad Co. has supplied new capital for improvements and extensions of the lines owned by it: e. g.—double tracks on Oakland and Alameda lines, new ferry-boat "Piedmont," new wheel fundry at Sacramento, new shops, round-houses, station buildings, iron bridges, cars, etc., for 1881, \$250,627; for 1882, \$1,549,100; for 1883, \$2,160,808; total, \$4,060,535.

"This does not include new lines built by railroad companies which are not owned, but leased by the Central Pacific Railroad Co. Thus the total amount expended by the Central Pacific Railroad Co. in three years, before the payment of any dividends has been \$70,205,892.30. With the exception of the amounts paid to bondholders, including the United States Government, on account of capital furnished in constructing the roads, much the greater portion of this sum has been expended in California, and upward of \$24,000,000 of it has been directly paid for labor. The balances available for dividends during these years were:

For 1881.....\$4,893,757

For 1882.....3,951,042

For 1883.....3,126,294

"This shows a net decrease in the net profits for 1883 from the year 1881 of \$1,767,463, or in the past two years a net reduction of 36 per cent. The balance available for dividends on the business of 1883 amounts to 5½ per cent. on the capital stock. The rates for freights and fares charged by the company have been steadily decreased, as experience has shown they must continue to do in the future to meet the requirements of competition and to encourage the development of traffic. The average rate charged on the whole system, from the Rio Grande to the Great Salt Lake per passenger per mile was:

	Cents.
For 1881.....	3.46
For 1882.....	2.92
For 1883.....	2.73

"The charge for the state of California for the same period was as follows: 1881, 2.68 cents; 1882, 2.56 cents; 1883, 2.20 cents. Had the average charged for the whole system in 1881 been maintained in 1883, the passenger receipts for the latter year would have been \$960,661 more than they actually were. The freight statistics for the past year are so voluminous that, I regret to say, it has been impossible to complete them in time for this report. These items will be furnished your Honorable Board as soon as they are finished. The average charges for freight on the whole system in the years given in this foregoing statement were: For 1881, per ton per mile, 2.16 cents; for 1882, per ton per mile, 1.81 cents. Had the average rate for 1881 been maintained in the traffic of 1882, the freight receipts for the latter year would have been \$3,160,434 more than they actually were. The result for 1883, when the figures are completed, will, no doubt, show a saving to the people of this state and other shippers of an amount equally as great."



Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

THE CHICAGO & NORTHWESTERN'S IOWA LEASES.

The main line from the Mississippi at Clinton across Iowa to Council Bluffs worked by the Chicago & Northwestern Railway Company was built before the opening of the Union Pacific Railroad by two corporations, the Chicago, Iowa & Nebraska Company building the 82 miles from Clinton to the Cedar Rapids and also the bridge at Clinton, and the Cedar Rapids & Missouri River Company the 271½ miles from Cedar Rapids to Council Bluffs, and also a branch from the eastern end of the other road at Clinton, north 2½ miles to Lyons. The former was completed as early as 1859; the latter not till 1867. The Clinton-Cedar Rapids road was leased to the Northwestern, or rather to the Galena & Chicago Union Railroad, one of the lines absorbed by the Northwestern, in 1862. By the terms of the original lease the rental was to be 47½ per cent. of the gross earnings. Soon the construction of the Union Pacific caused very heavy shipments of materials to be made by this line, for which high rates were charged, and then there was probably a profit on the lease—possibly a very large profit. But after the Union Pacific had been completed this enormously profitable traffic ceased, and the interchanges with the Union Pacific did not begin to take its place, especially when this line ceased to be the only eastern connection of the Union Pacific, but was only one of three. Shortly after this time the rental was reduced from 47½ to 37½ per cent. of the gross earnings—possibly because the possession of the Iowa Midland would soon make it possible to turn the traffic of the Cedar Rapids & Missouri River road—the chief traffic—over another route; and a very oppressive rental might make it desirable for the Northwestern to do this. Even after the rental was reduced, it was more than the reported net earnings of the road; traffic grew enormously with the settlement of Western Iowa and later with the development of the trans-Missouri country; but the rates went down as the traffic grew, and with working expenses 65 or 70 per cent., the more the gross earnings the worse for the lessee, unless it could make up east of the Mississippi what it lost west of it. Not long ago a further modification of the rental was made, according to which the maximum was made \$500,000, the lessee assuming whatever drawbacks might be allowed to certain Western connections. As the property leased was simply a single-track road without equipment, this maximum, which amounted to more than \$6,000 per mile, pays a very handsome interest on the cost.

The Cedar Rapids & Missouri River road was also leased to the Northwestern's predecessor in 1862, when a comparatively small part of it was completed. It was completed to the Missouri River early in 1867, and over it the larger part of the Union Pacific materials and supplies was carried, giving it while it was still a wretchedly cheap and poor structure very large profits. The lease of this road provided for a rental of \$700 out of the first \$1,500 of gross earnings per mile, 33½ per cent. of the next \$3,000, and 20 per cent. of any excess over \$4,500 per mile. In the year ending with March, 1883, the rental of the 274 miles amounted to \$854,646, or \$3,119 per mile, indicating earnings at the rate of \$11,595 per mile. The provision which limits to 20 per cent. the rental for additions of earnings over \$4,500 per mile might well have been made after experience with the Chicago, Iowa & Nebraska lease.

When these roads were leased to the Chicago & Northwestern, the proprietors reserved the land grant, which was united with those of the Sioux City & Pacific and the Illinois Central's leased line across Iowa, built by the same association of capitalists, in the possession of a land company.

It is now proposed that the Northwestern shall purchase these leased lines, and also the Maple River Railroad, a branch of the Cedar Rapids & Missouri River road, built of late years, and now 100 miles long. There are many reasons why they should be an integral part of the Northwestern's property, some of which have been indicated above.

In the first place, the lease provides for no improvements to be made by the lessor. But it has been simply impossible to work the road as it was when the Northwestern took it. The lessee has substantially made a new road of it at its own expense, has built the necessary shops, etc., and virtually pays rent for its own improvements, as it is only by means of these that the present bulk of traffic could be conducted. Soon the question of a double track will come up, as the Northwestern has built a great system of feeders extending over Northwestern Iowa and connecting with its Minnesota and Dakota lines, which serve still further to increase the traffic, earnings—and rental—of the leased lines.

But if the terms of the present leases are so favorable to the lessors, why should they consent to a consolidation? Because if the rental becomes burdensome the Northwestern can easily complete a parallel line and give it the bulk of its through traffic and connect its feeders with it. It has lines, now worked as branches, which could be made into such a parallel line by the construction of comparatively short connecting links. The Iowa Midland reaches from the Mississippi west 70 miles to Anamosa; thence to the "Northern Iowa Division" at Toledo is not more than 75 miles; thence the company has a railroad completed due west 124 miles to Lake City, which is but about 15 miles northeast of Carroll, whence the company's "Iowa Southwestern" branch extends 35 miles in the direction of Council Bluffs to Kirkman, which is but about 50 miles from Council Bluffs. The whole great Northwestern Iowa and Dakota system can be connected with the Iowa Midland by building less than 75 miles of railroad. It is not probable that it will be so used as to increase the rental the Northwestern will have to pay when it can so easily be made to contribute to the profits of road which it owns.

The agreement made between the directors of the Northwestern and those of the three Iowa companies (which are largely one in ownership) is that the Chicago & Northwestern shall assume the funded debts of the three companies, amounting in the aggregate to \$4,915,100 bearing 7 per cent. interest, and maturing between 1891 and 1897, and pay \$14,757,500 in its common stock for their capital stock. Thus the road absolutely purchased, being 488 miles, would cost at the average rate of about \$40,000 per mile. But the lessor companies and their principal owners own nearly all the capital stock of the Sioux City & Pacific and the Fremont, Elkhorn & Missouri Valley roads, and the Blair Bridge which unites them, forming the considerable system of 418½ miles of railroad in Western Iowa and Northern Nebraska, extending for nearly 300 miles west of the Missouri River, reaching the grazing country, and interlacing in Northeastern Nebraska with the Northwestern's St. Paul & Omaha lines. It is part of the agreement that the Northwestern shall have these stocks for \$1,968,000 of its 5 per cent. debentures, running 25 years. These lines have a funded debt of \$6,234,500—about \$15,000 per mile; besides the Sioux City & Pacific's second mortgage of \$1,628,320 to the Government and the accumulated interest thereon, both interest and principal being due in 1898 and 1899. These roads have not heretofore been directly profitable, but they have contributed profitable traffic to the long Northwestern main line across Illinois and Iowa, and the completion of the bridge over the Missouri River at Blair makes it possible to get a share of the live stock which otherwise would go to the Union Pacific (and so one-quarter or so only to the Northwestern) or to the Burlington. They pass through a new country which is not yet fairly developed—very much less so than Nebraska south of the Platte.

The circular issued by the Northwestern to its stockholders says that the obligations assumed by the purchase of the three leased roads, in case 7 per cent. dividends are paid on its common stock, will amount to \$1,889,082 yearly, while the rental in 1883 was \$1,558,753. The Sioux City & Pacific and the Elkhorn roads will probably earn their interest, but possibly not more at present, and \$98,400 per year will be the interest on the debentures to pay for their stocks.

If this agreement is carried out (it has yet to be voted on by the stockholders of the several companies), the Northwestern will have added 488 miles to the road that it owns directly and 418½ miles to what it calls its proprietary roads, giving it a total of 4,268 miles virtually owned, besides a controlling interest in the 1,290 miles of the St. Paul & Omaha. This will give it a mileage owned but about 500 less than that of the Milwaukee & St. Paul. Its extreme western terminus, at Valentine, Neb., will be 773 miles west of Chicago, as its extreme northwestern terminus (by a wholly different line) at Columbia, Dak., is 759 miles, and its extreme northern terminus near Lake Superior by a third line, is 393 miles from Chicago.

Until the stockholders have voted, of course it cannot be positively known whether the proposed sale will be effected. A very large proportion and perhaps two-thirds of stocks of the Iowa roads is owned by the directors who have made the agreement; but the Northwestern stock is scattered among many investors. But the present arrangement is one that seems not safe for either party as a permanency.

SHAM TESTS.

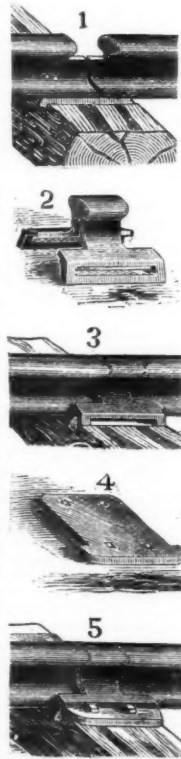
We are all tolerably familiar with certificates of prominent chemists to the merits of various patent medicines, toilet soaps and such like, worded as if to tell just enough and not too much, and reading very much as if the words had been dictated by the proprietors of the articles themselves. It is usually thought that this kind of certificate, while it may add largely to the size of the chemist's fees, does not add largely to his reputation, and that it is in some way inconsistent with strict professional integrity. Nor is such suspicion unnatural, for it is generally apparent that the whole truth is not stated nor intended to be; and a suppression of the truth often amounts, as the old proverb has it, to a suggestion of the false.

It is at once painful and amusing to see this same style of certificate-to-order appearing among reports of physical tests of structural material, which have heretofore, so far as we know, been wholly free from them. We have lately come across a flagrant instance of the kind which should not be permitted to pass in silence. We refer to certain tests lately made in this city of the "Gibbon boltless rail-joint" on a splendid and costly testing machine, the use of which is open to the public on payment of charges.

With the merits of the device itself we have nothing whatever to do. We illustrated it, without comment, in our issue of Nov. 9, 1883, as a matter of current news. Were we called on to express any opinion of its real promise it might or might not be a hopeful one, but we have no intention of expressing any opinion whatever, and hasten to admit that the joint may possess very striking merits which we do not perceive. We are assured that it is well thought of on the road where it has been undergoing test for the past seven months, and that certain high officials of a great line which we all respect are much struck with its merits. Several technical journals, also, have more or less explicitly indorsed the device. To avoid any possible unfairness we reprint certain of these favorable opinions in another column.

But while expressing no opinion on the device itself, we do say that the "tests" by which its merits are defended are, mechanically speaking, mere shams. That our readers may have opportunity to judge for themselves, the essential features of the device are shown in the figures numbered 1 to 5 herewith. The rails being slotted as shown in 1, the cap, 2, an unfinished steel casting, is placed over them, as shown in 3. The base-plate, 4 (which is not a wedge, but a flat steel casting, also unfinished), is passed through the slots in 2 and under the rail, and spiked to the tie, giving the complete joint, 5.

Mechanical readers will at once perceive that, whatever other merits the joint may have, it is absolutely destitute of vertical stability; or, to speak more precisely, it possesses just as much vertical stability as a heavy old-style wrought chair, and no more. Neither joint nor chair has any tendency to prevent deflection, but after the joint has de-



flected more or less, there is a binding action of the lips of the chair against the base of the rail, which adds somewhat to its strength. Practically, as respects preserving the continuity of the rail and preventing low joints, either the Gibbon joint or the old chair is mechanically equivalent to no joint at all. To correct this supposed defect of the old chair fish-plates were introduced, which do in some measure make a continuous beam of the rail, offering some resistance to deflection at every point, as if there were a continuous solid rail.

This being so, a habit of testing joints for vertical strength has very naturally followed, and it is the first thing men ask about in examining a new joint. The usual manner of making such tests is shown in fig. 6,

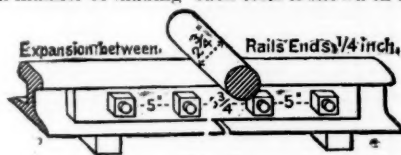


FIG. 5.

which we reprint from a report of a series of such tests given in our issue of Aug. 17, 1877. Two pieces of rail are united into continuous beams by the joints to be tested, placed upon supports at a given distance from each other and loaded at the centre, the deflections, elastic limit, etc., being carefully noted. We have published many such tests and hope to publish many more.

It is impossible to make any similar tests of the vertical strength of the joint we illustrate, since it has none to test until it has deflected beyond all limits of admissible practice, and very little then. Nevertheless some scientific tests are the first necessity to introduce any new joints to favorable notice, and the tests were made and certified to in the manner illustrated in figs. 7 to 9, which we forbear to characterize further than to say that the tests were simply tests of the strength of two disconnected beams, fixed at one end (instead of simply supported) and loaded at the other, and that the "Gibbon joint" had no more to do with the tests than the round iron bar has, lying on top of the joint in fig. 6, both serving merely to transmit the strain. This should certainly be evident to any "engineer of tests," and the very heading of the tabular report—"Results of Experiments on the Gibbon boltless rail-joint to ascertain the resistance under a gradually increased bending stress"—in itself conveys a false impression. We have not space for the table itself. It goes into all the minutiae of deflection under successive loads which are usually given in tests for transverse strength of a true beam, and at first sight impresses one that the tests are of the same kind. The substance of each (with the cuts which show how it was made) is reproduced in connection with the "conclusions of report of engineer in charge," which cannot be done justice to without separating it into paragraphs. They are *verbatim* as follows, the italics being all our own:

"The heaviest locomotives of the present day rarely, if ever, are built to give a load of more than 10,000 lbs. on a single driver. If this load be doubled to allow for a severe case of impact due to high speeds, a load of 20,000 lbs. is obtained as the maximum stress that can be placed on a rail joint at any time."

A more nearly correct statement would be that locomotives of the present day are "rarely, if ever, built to give a load of less than 10,000 lbs. on a single driver." Locomotives with 12,500, 14,000 and 15,000 lbs. per wheel exist in great numbers, for both passenger and freight service. The Pennsylvania Railroad has, or did have two years ago (Rept. Am. Ry. M. Assn., 1882, p. 25) 16,250 lbs. per wheel; the Central of New Jersey, 15,750 lbs.; the Reading, 17,000 lbs.; the Great Northern of England, 20,160 lbs., and the New York & New Haven, 22,000 lbs. per wheel on four wheels, "and they stated that they would not have a pound taken off it under any consideration." These loads are nearly doubled at high speeds by the normal centrifugal force of the counterweights, and are certainly liable to still further great and irregular additions from oscillation and concussion.

"An inspection of the foregoing tests gives the following factors of safety under different conditions in the case of the Gibbon joint, used as a suspended joint, with the ties placed 20 in. apart. A load of 104,000 lbs. (52 tons) was sustained without any signs of failure of the joints, thus giving a factor of over 5. (Test discontinued.)"

The italicized statement is true for one test, the rails being arranged as in fig. 7 below (which is drawn to scale); the "deflection"—in other words, compression of ties under load—being 1.45 in. An identically similar test when the joint failed ("cracked slightly") under 66,500 lbs. is not alluded to at all in the "summary of conclusions."



FIG. 7.

"In experiment 487, with ties set 20 in. apart, and the middle tie support on a yielding foundation of sand, a load of 75,000 lbs. was supported without failure, giving a factor of nearly 4. (Test discontinued.)"

The "yielding foundation of sand" is shown to scale (these being reduced copies of the company's drawings of the tests) in fig. 8. The sand-box, we are told, was hooped with iron.

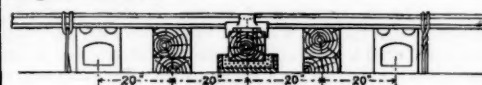


FIG. 8.

The "deflection" of the joint in this interesting test of "resistance to deflection under bending stress" is duly recorded in the table as 1.275 in. under 65,000 lbs.

"In experiment 488 B. The joint with a span of 40 in. (no tie under the joint) failed under a load of 67,000 lbs. (by table, 67,090), giving a factor of over 3, under circumstances as unfavorable to the joint as may be supposed to occur when the ballast of the track has been washed away from the ties adjacent to the joint.

"Furthermore, in this test, the rails themselves failed at the same time as the joint, showing that under such circumstances, at least, the joint was as strong as the rest of the track."

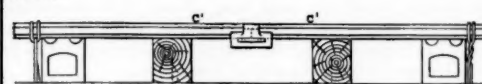


FIG. 9.

It is difficult to preserve due moderation and charity in speaking of such a sentence as the closing one above. We do not remember to have ever met with such a truly unpardonable misrepresentation of scientific truth as is contained in the closing italicized statement above. Fig. 9 shows to scale the conditions under which the test was made, the rails having failed by rupture at the points *c'*, with a "deflection" of 2.800 in. at the same time that the joint "failed" by tearing the bottom of the rail from the web. The points *c'* were each 17½ in. from the joint.

With a beam of uniform section (the two rails) fixed at one end and loaded at the other (by the pressure on the joint), where could the break possibly come but at the point *c'*, nearest to the point of support? To make it perfectly clear to untechnical readers, suppose a man should insert a stick into a crevice in a rock to break it off, and insist that "his grip was stronger than the rock itself," because the stick broke—as of course it would—close to the rock instead of close to his hand?

It seems a waste of time to comment in detail on the error in the italicized statement just preceding it, which may be a mere thoughtless exaggeration. But perhaps as objectionable a part of the report as any is contained in its closing paragraphs:

"From the above conclusions it may be safely asserted that the Gibbon joint is strong enough to do all the work that may be expected from a railway splice, under even very adverse circumstances."

"The steel castings that were used in these tests were remarkably soft and ductile, so that there need be no apprehension that such castings would wear unequally with the rails."

"The joint, therefore, would seem to be eminently adapted to do the work for which it was designed, and to obviate many of the objections to the present systems."

Engineer in Charge."

Barring all questions of the adequacy of the tests, the impropriety of such expressions as the above—not only giving the results of the tests, but the conclusions to be drawn therefrom—is too evident for discussion. The mission of the "engineer of tests," however skilled and experienced, is simply to perceive and to declare results, leaving to others to interpret. But when such certificates are granted on so slim a foundation as the one above it tends to make the whole business ridiculous in the eyes of practical men, and thus to do great harm. For, in addition to the faults which we have gravely criticised, there is a certain ridiculous element in the mere formation of such decided opinions as to a device of this kind on the sole basis of such tests, however well made; for they are not calculated in their nature to justify any decided opinions whatsoever. Suppose an "engineer of tests" should have a locomotive brought him to have its parts stretched on his scientific rack, and should proceed to declare that he found the strength of this and that part to be so much per square inch, and its elastic limit such and such, and so forth and so on, and that consequently the engine seemed "eminently adapted to do the work for which it was designed." Such a certificate would differ only in degree from the one we are discussing.

Had this machine not been one of the finest in the world, or had the engineer not been, as we believe he is, a trained and educated man, who might be supposed to be competent to see that all tests made were what they professed to be, and who, no doubt, is competent to handle the machine itself, or had we less at heart the wider and fuller use of such aids to exact knowledge, we should not have devoted so much space

to this matter. But the more earnestly one desires to see such machines properly and generally used, the more emphatically one should expose and condemn an instance of their wrongful use, whether intentional or—as in this case no doubt—unintentional. For there is no surer way to bring all scientific tests without distinction into discredit and contempt.

Track Tanks.

These tanks present so many advantages, independently of the fact that they enable an engine to run a long distance without stopping, that it seems probable that they will be more generally adopted and used for through freight as well as fast passenger trains. The saving in the weight of the tender, consequent on the smaller quantity of water to be carried, and the fact that on arriving at a way station the engineman and fireman can devote their whole attention to oiling and examining their engine, and need spend no time in taking water, are evident advantages; but in some cases these are hardly as important as the facility which the tanks give of obtaining a suitable quality of water. In many cases the supply available at the terminus, or stopping stations for express trains is deep well-water, pleasant to drink, and perfectly clear, but apt to form hard scale in the boilers. On the other hand the only supply available may be water polluted with waste dyes, acids, or grease, etc., from various factories. In either case the water is injurious to locomotive boilers, and being within town limits is often sold at a high price, while suitable surface water depositing only soft scale may be obtained for little or nothing along the line of railroad, and utilized by means of the track tanks. Before locating the exact position of these tanks it is well to ascertain by chemical analysis and actual experiment the quality of the water found at different points along the road. It often happens that two kinds of water, each having a bad effect on a boiler when used alone, neutralize one another when used together. A corrosive water will often detach the scale formed by another kind of water. In some cases it is impossible to find any good water, or even any two kinds of bad water which will neutralize one another, but the track tank gives a much larger choice. The supply of water need not be necessarily close to a station; if found anywhere along the line it can be utilized. This is often done by setting up a water crane, necessitating a special stop for the sole purpose of obtaining water. This extra stop causes a loss of time and an increased amount of wear and tear, the cost of which in the aggregate amounts to a considerable sum, though it is difficult to determine its exact money value.

The grade must, of course, be level for 1,000 ft., the length of the tank, and if the most convenient location happens to be on a grade of say 53 ft. to the mile, the levels must be altered for a short distance. If it is considered that a short grade of 80 ft. to the mile is permissible, less than a thousand feet of this grade will be required at either end of the level track tank. Such a short grade would have but little effect on an ascending freight train, as the whole train can only be on the grade for a very short space, and as soon as the engine and tender gain the level, the tractive power to be exerted by the engine would only equal that necessary on the 53 ft. grade. The track at the end of the tank nearest the foot of the grade would have to be raised 5 ft. above the normal surface of the grade, and sunk a corresponding distance at the other end of the tank. This would not under ordinary circumstances involve any very expensive alterations. Freight trains would, however, need to be carefully handled in descending these changes of gradients, which have some tendency to jerk and fracture couplings.

There was a meeting of the Presidents of the trunk lines in New York this week, at which was debated the rule by which the late reductions from 30 cents to 15 cents per 100 lbs. from Chicago to New York were made last March, as also the reduction from 30 to 20 cents for 10 days last January. When the rule was made originally, which was during the troubles that culminated in the railroad war of 1881, it provided that when it should be proved that rates were cut at any place within the territory of the trunk lines and their connections, the Commissioner might at once make a general reduction of rates to the level of the cut rate. The railroad war that followed rendered this rule unavailable; it was early in 1883, we believe, that a change was made in the rule making it the duty of the Commissioner, when satisfied that rates were being cut (not being required to have absolute proof) to reduce all rates to a level of the cut rate on application of any line interested. Last March the Pennsylvania Railroad complained that rates were cut,

† Trans. Am. Soc. C. E., 1876, p. 341, "Resistance of Railway Trains."

For 12 successive years the earnings and expenses of these lines east of Pittsburgh and Erie have been:

Year.	Gross Earnings.	Expenses.	Net Earnings.
1873.....	\$3,305,901	\$2,339,678	\$966,223
1874.....	2,961,575	2,000,021	961,554
1875.....	2,628,411	1,691,616	936,795
1876.....	2,663,897	2,033,222	630,675
1877.....	2,410,804	1,517,108	893,696
1878.....	2,490,286	1,531,448	957,838
1879.....	2,603,667	1,615,344	987,223
1880.....	3,278,186	1,766,938	1,511,249
1881.....	3,844,304	2,045,078	1,799,226
1882.....	4,912,293	2,496,491	2,415,802
1883.....	4,189,380	2,733,963	1,455,417
1884.....	4,002,627	2,598,076	1,404,551

Thus the gross earnings were larger this year in March than in any other except last year; this is true also of the working expenses, but the net earnings are not only less than last year, but less than in any other year since 1879, after which there was a sudden and very large increase of the earnings of this road, as of most others. Since 1880 there has been an increase of \$724,441 (22 per cent.) in gross earnings, but an increase also of \$831,138 (47 per cent.) in the expenses, so that there was a decrease of \$106,698 (7 per cent.) in the net earnings.

The lines west of Pittsburgh and Erie in March lacked \$108,893 of meeting all their liabilities for interest, rentals, etc., which is about the same as in January and 30 per cent. less than in February. For six successive years the surplus or deficit of these lines in March has been:

Year.	1879.	1880.	1881.	1882.	1883.	1884.
Surplus.	Surplus.	Surplus.	Deficit.	Surplus.	Deficit.	
\$23,562	\$557,171	\$524,489	\$12,236	\$153,363	\$108,893	

Thus the profits of the Pennsylvania Railroad Company from the two systems was \$1,295,668 this year, against \$1,608,733 last year; for to the decrease of \$50,876 on the Eastern system we have to add a decrease of \$262,249 on the Western system.

For the three months ending with March the lines east of Pittsburgh and Erie show a decrease of \$827,359 (7 per cent.) in gross earnings, of \$259,446 (3½ per cent.) in working expenses, and of \$567,913 (13½ per cent.) in net earnings, and for eight successive years the earnings and expenses in these three months have been:

Year.	Gross Earnings.	Expenses.	Net Earnings.
1877.....	\$6,960,070	\$4,635,058	\$2,325,012
1878.....	7,085,492	4,467,754	2,590,738
1879.....	7,084,532	4,501,991	2,579,541
1880.....	9,300,314	5,199,785	4,100,529
1881.....	10,129,134	5,965,143	4,163,991
1882.....	10,592,366	7,022,877	3,569,489
1883.....	11,830,953	7,567,975	4,262,978
1884.....	11,003,584	7,308,529	3,695,055

As for March, the gross earnings and working expenses were larger in the three months this year than in any other except last year; but the net earnings were not only less than last year, but less also than in 1881 and 1880.

For these three months the surplus or deficit of the lines west of Pittsburgh and Erie has been:

Year.	1879.	1880.	1881.	1882.	1883.	1884.
Surplus.	Surplus.	Surplus.	Deficit.	Surplus.	Deficit.	
\$149,459	\$1,049,129	\$1,070,718	\$12,286	\$276,640	\$365,490	

Thus the returns of these roads were much more unfavorable this year than in any other, and more than \$1,400,000 less than in 1880 and 1881.

Adding the surplus or deficit of this Western system to the net earnings of the Eastern system, we have as the profits of the Pennsylvania Railroad Company from the two systems in the first quarter of the year:

Year.	1879.	1880.	1881.	1882.	1883.	1884.
\$3,329,000	\$5,158,657	\$5,234,709	\$3,557,203	\$4,539,618	\$3,329,575	

Thus we have to go back to 1879 to find the profits as small as they were this year, when they were \$1,210,000 less than last year, \$1,905,000 less than in 1881, and \$1,829,000 less than in 1880.

This great decrease in profits comes when there has been a great increase in the capital stock, which was about 69 millions down to 1881, 77½ millions at the end of that year, 85 millions a year later, and is now about 93 millions. To pay 2 per cent. for a quarter requires \$1,960,000 now, while until after this time in 1881 it required but \$1,375,000, and last year \$1,700,000.

Last year, after paying a dividend of 8½ per cent., there was a balance of \$2,022,000, but \$603,000 of this was set against "settlement of claims and old accounts, and amount charged off for depreciation," leaving \$1,418,500 carried forward to credit of profit and loss. As in a single quarter of this year there has been a decrease of \$1,210,000 in the profits of its two great systems of railroads, it is easy to see that the profits may this year not be enough to pay last year's rate of dividend. The company's income does not come entirely from the railroads, it is true; in 1883 its income from its investments in the securities of other companies yielded it \$4,113,000; but it is not probable that there will be an increase in this income at a time when there is so large a decrease in the profits of the railroads controlled by the company, it being their securities which form a very large part of its investments.

Opening of Lake Navigation.

Lake navigation is now open, a steam barge having made its way through Mackinac Straits, Thursday, April 24. Last year the first passage through the straits was April 28; the year before, April 5; in 1881, May 4. About the same date the first vessel got out of Buffalo harbor. For a week or so before the opening charters were made of vessels to take grain from Chicago to Buffalo, usually at 2½ cents a bushel for corn and 2½ for wheat. This is the lowest opening rate ever made, except in 1882, when it was ½ cent lower. For five successive years the opening rates have been:

Year.	1880.	1881.	1882.	1883.	1884.
Wheat.....	5	5	2½	3½	2½
Corn.....	5	4½	2½	3½	2½

There were very small stocks of grain in store when the

low rates were made in 1882; but there are very large ones now. Nevertheless, with the present rail rates, amounting to but 8.4 cents a bushel for corn and 9 cents for wheat from Chicago to New York, a low rate was inevitable. The canal will not be open for some time to come, and probably the grain now shipped will have to go into store at Buffalo or be forwarded thence by rail. The lake rate is very nearly as high as the share of the rail rate received by the railroads between Chicago and Buffalo, and unless the canal rate is much lower than usual at the opening, the lake and canal rate will be so near the present rail rate that we should expect rail shipments to be preferred. After the first few days the canal rate last year was 4 cents a bushel for corn, and 4½ for wheat; the transfer charge at Buffalo is not likely to be less than ½ cent, on this basis it would cost 7½ cents a bushel for wheat from Chicago. But the vessels will not adhere to these rates if they prevent shipments. Last year the lake rates did not go below 2 and 2½ cents, but in previous years 1½ cents was the corn rate for weeks in succession, and 1 cent has been touched, which, however, does not tempt vessels to sail unless profitable cargoes up the lakes await them at Buffalo. Last year the canal rates one week touched 3½ and 3½ cents; but in previous years, when the boats paid about 1 cent a bushel toll, 3½ cents has been taken for some time. It is reasonable to suppose that the boats will carry at 3 cents this year if they cannot get any more; and probably they cannot get much more if the 15-cent rail rate is adhered to. The effect of this rate on the opening lake and canal rates was probably more feared when the reduction was made than anything else. Grain was moving very slowly then, in spite of the great stock that had accumulated at Chicago. If held till navigation opened most of it was sure to go by lake. A rate which would start this grain forward before navigation opened, provided it was high enough to leave the slightest profit, might be wise at such a time if the effect ended with the rate. But it will not do to ignore the existence of the vessels. If when navigation opens the elevators are full and rail rates have been maintained at a fairly profitable figure, the vessels are likely to get good rates, and for the large portion of the shipments which go to interior points the railroads are able to collect a profitable rate. But if before the opening of navigation the railroads have carried away the grain at rates which do little or nothing more than pay expenses, and there is not enough left to give cargoes to all the vessels, then the vessels are almost sure to compete for what is left until they bring their own rates down very low, and compel the railroads either to go without grain or to accept an unprofitable rate for carrying it. This year, however, notwithstanding the very low rail rates for the past few weeks, plenty of grain is left in the elevators for the vessels, and if the railroads advance their rates it should be possible for the vessels to advance theirs.

Much depends, however, on the number of vessels competing for the grain, and this again depends on the demand for vessels for other purposes. Perhaps there will be as much lumber to carry as last year, but usually not many vessels engage in the lumber trade that are suitable for grain. But many such vessels are engaged in carrying Lake Superior iron ore from Marquette or Escanaba to Lake Erie ports, where iron manufacturing is active. It can hardly be expected that as many vessels as last year or the year before will be engaged in this trade this year, and consequently we should expect to find more vessels than usual competing for the grain.

For the week ending April 26, the eastward shipments, through and local, of flour, grain and provisions from Chicago show a very great falling off when compared with the shipments of previous weeks since the 15 cent rate was made, being 67,899 tons, against 29,733 in the corresponding week of last year, and 82,907 in the previous week of this year. For five successive weeks these shipments have been:

Week ending	March 22.	March 29.	Apr. 5.	Apr. 12.	Apr. 19.	Apr. 26.
Tons.....	54,357	70,218	90,753	97,653	82,907	67,899

Thus the shipments last week were 15,008 tons less than the week before and 29,854 less than in the week to April 12, when the heavy movement culminated. It might be supposed that this has been due to the exhaustion of the stocks waiting to be carried, and doubtless there has been a reduction of these stocks, though a very large amount of grain remains in the Chicago elevators. It can hardly be said, however, that all this grain is waiting to be carried. The holders of the larger part of it seem to be willing to keep it for some time yet. But there has been such a rise in the price of wheat, following the great fall in March, as would naturally check shipments, amounting to 8 or 10 cents a bushel, which is as much as the transportation costs. And very nearly the whole of the decrease in shipments last week was in grain, of which 76,407 tons were forwarded in the week to April 12; 65,944 in the following week, and 51,242 tons last week—a decrease of one third in two weeks. It should be borne in mind, however, that the shipments last week were positively large, and that they were made virtually in competition with lake rates; for though no vessels cleared with grain till the end of last week, the opening this week was expected, and several vessels were chartered and took on cargoes, rates being 2½ cents a bushel for corn, and 2½ for wheat to Buffalo, which is but 1 cent below the opening rate last year, and is near the lowest opening rate ever made. This is unfavorable to the railroads, as it makes it more difficult to advance their rates.

The percentages of these through and local shipments

going by the different roads were as follows in the past two weeks:

	Apr. 19.	Apr. 26.		Apr. 19.	Apr. 26.
C. & Grand T.....	13.5	10.6	Ft. Wayne.....	13.7	13.2
Mich. Cen.....	9.6	11.1	C. St. L. & Pitts.....	13.3	9.6
Lake Shore.....	13.0	12.4	Balt. & Ohio.....	11.2	10.4
Nickel Plate.....	15.2	10.6	Chic. & Atlantic.....	9.8	21.9

Thus the newest road has much the largest share of the shipments, but aside from the extraordinary share going by the Chicago & Atlantic the shipments were more evenly divided than usual last week. The three Vanderbilt roads carried 34.1 per cent. of the whole, against 37.8 the week before, and the two Pennsylvania roads 23 per cent, against 27.3 the week before.

A new apportionment of the Chicago percentages was made by the board of arbitrators (Messrs Adams, Riddle and Gault), last week. This was made on a rehearing of a previous award of theirs, which was made on appeal from Mr. Fink's provisional award dating from July 1, 1883, which gave 11 per cent. to the Chicago & Grand Trunk, 18½ to the Michigan Central, 17 to the Lake Shore, 8 to the Nickel Plate, 19½ to the Fort Wayne, 8 to the Chicago, St. Louis & Pittsburgh, 7 to the Baltimore & Ohio, and 11 to the Chicago & Atlantic. This provisional award served only as a working basis, and was superseded from the date it went into effect (July 1 last) by the award made on appeal to the arbitrators, which was never made public, but is reported to have made some small changes. The new award is not made known, but some changes in circumstances were taken into account in making it, and it is probable that a change in percentages was made.

In the large decrease in Northwestern grain receipts since March the losses have been proportionally larger at St. Louis and Toledo than elsewhere.

The percentage of the total Northwestern receipts received at leading markets has been:

	Jan. and Feb.	March.	Week to Apr. 19.
Chicago.....	51.5	42.0	47.5
Milwaukee.....	7.2	6.4	6.2
St. Louis.....	16.2	28.2	18.7
Peoria.....	11.2	10.5	15.0
Toledo.....	8.0	7.7	5.7

Thus of the receipts in the last week reported a much smaller proportion went to St. Louis than in March, when rates are said to have been cut from that place especially, yet a larger one than in January and February. But at Peoria the percentage in April was larger than in the first three months of the year, and unusually large for that place, though it was one of the grievances that cutting prevailed at Peoria before rates were reduced. The percentage at Chicago was unusually large in January and February, and as large as usual in March. It was much larger than usual in April, but not larger than last year. Its proportion of the receipts is usually larger after than before lake navigation opens, though it may be low in May, if the farmers are very busy then in the territory from which it receives.

The effect of lower prices and low freight rates, which went into effect about the 20th of March, we saw last week was not visible in our grain exports until the week ending April 12, when there was a very large increase in the exports of wheat. In the following week there were still larger wheat exports, and they may fairly be called large. It is noticeable, however, that there is no increase in flour exports, though the rates on flour have been reduced the same as on grain, and its price depends on that of wheat. The exports of flour and wheat for five successive weeks have been:

	March 22.	March 29.	Apr. 5.	Apr. 12.	Apr. 19.
Flour, bbls.....	131,651	116,748	102,005	106,008	110,312
Wheat, bu.....	347,071	607,947	503,388	1,272,501	1,343,073

Substantially the whole increase in grain exports has been wheat, or, indeed, the increase in all grains has been less than increase in wheat, the total weekly exports of all grains having been:

	1,150,945	1,528,901	1,261,068	1,925,317	2,067,598
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In the last week 735,000 bushels more wheat, but only 538,600 bushels more of all grains were exported than in the fourth week of March. An exceptionally large proportion of the exports in the last week were from Baltimore—34½ per cent. of the whole, and very nearly the same as from New York. Baltimore has rarely made large wheat exports except when a great deal was marketed from the Ohio Valley, which has a short supply this year.

The length of railroad owned, leased and controlled by the Pennsylvania Railroad Company Jan. 1, 1884, was 6,837½ miles, of which 5,283 miles were main line and 1,554 branches. This road was in no less than 13 different states, and chiefly in the following:

Pennsylvania.....	2,565	Michigan.....	375
Ohio.....	1,265	Maryland.....	356
Indiana.....	1,053	Illinois.....	302
New Jersey.....	605	Delaware.....	164

Also 70½ miles in New York, 8 in the District of Columbia, 33½ in Virginia, 47 in West Virginia, and 3 in Kentucky.

These 6,837½ miles of road include 10,575½ miles of track, there being 1,028.7 miles of second track and 2,467½ of sidings, 363½ of the latter being the sidings of private establishments connected with the railroad; besides 161 miles of third track and 81 of fourth track.

The lines east of Pittsburgh and Erie, which had 3,652½ miles of the road, had 872½ miles of the second track; while the lines west of Pittsburgh and Erie, which had 3,185 miles of the road, had only 156½ miles of the second track; but the western system had 807½ miles of sidings, against 1,570 in the eastern system. Altogether there were

176 miles of track to 100 miles of road on the eastern system, and 132 miles of track to 100 of road on the western system.

At a meeting of the Chicago Committee of the Joint Executive Committee in New York, April 18, it was agreed that the percentage of gross earnings on balances due by roads "over" to roads "short" in the pool, which for freight is fixed at 40 per cent., on live-stock shall be 45 per cent., the chief reason being that a terminal charge is deducted before the freight rate is divided, but not from the live-stock rate. Thus with a 20-cent freight rate, there is first a deduction of 3 cents for the seaboard terminal, and only the 17 cents remaining is divided among the roads which form the line between Chicago and New York, while with a 50-cent live-stock rate the whole 50 cents is divided. With a 20-cent freight rate, therefore, not 40 per cent. of 20 cents but 40 per cent. of 17 cents—not 8 cents but 6.8 cents—is taken as the net earnings which the line over owes to the line short, while the road carrying this freight is allowed 10.2 cents and not 12 cents. If the rate were on live-stock the allowance for expense, at 40 per cent., would be 12 cents; by the new arrangement it is made 11 cents. The intention is to keep this allowance so small that it will be no advantage for any road to carry more than its share.

Mr. Joseph F. Tucker, who has recently resigned his position as Traffic Manager of the Illinois Central Railroad, after serving it in that capacity and as General Freight Agent nearly 20 years, is probably not so widely known among the railroad men of the country as if he had held a similar position on an east-and-west road of similar extent; but he stands in the very first rank among traffic managers for extent of knowledge of the business and especially of the principles of the business in which he has been engaged, having been a severe student of the subject, as well as an active and energetic executive, and having a certain judicial quality of mind which enables him to see more than one side of a question—a quality not very common in his occupation, and one which it does not tend to develop.

The American Society of Civil Engineers at the last annual meeting resolved that a badge be prepared "which members of the society shall wear at meetings, and which may be worn at other times."

The design recommended by a committee of members and adopted by the Board of Directors is shown full size in the cut herewith. It is of gold with blue enamel background, and is expected to be delivered in time for the annual convention at Buffalo, June 10, to such members as devote five dollars to the purpose. Some little difference of sentiment existed as to the propriety of adopting a badge.

The indications are that the coming convention will be very large and successful. Members living near New York are invited to take a special train over the New York, West Shore & Buffalo Railway, leaving New York Monday morning, June 9.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Beach Creek, Clearfield & Southwestern.—Completed from Jersey Shore, Pa., westward to Peale, 52 miles.

This is a total of 52 miles of new railroad, making 595 miles reported to date for the current year. The total track reported laid to the corresponding date for 12 years past, is as follows:

	Miles.		Miles.
1884.....	595	1878.....	267
1883.....	1,071	1877.....	263
1882.....	2,293	1876.....	432
1881.....	906	1875.....	320
1880.....	1,096	1874.....	375
1879.....	391	1873.....	654

These statements include *main track only*, no account being taken of second tracks or other additional tracks or sidings.

NEW PUBLICATIONS.

Two Papers on Express Trains. By E. Foxwell. London: Edward Stanford. 1884.

This neat and good-sized pamphlet is, to borrow almost the author's own words, a curious medley of panegyric and statistics. The first paper is devoted to an enthusiastic setting forth of the advantages of fast trains, looked at from a purely philosophical and metaphysical standpoint, and not at all from the vulgar plane of dollars and cents, although our author plainly believes that fast expresses are profitable to corporations as well as great moral agents for the enlightenment of mankind.

But the last paper is full of exact information (if it is exact) as to all the fast running done in England, including details of gradients, weight of trains, and similar matters, and should, consequently, have real value and interest for railroad officers in this country.

The character of our author's enthusiastic side in the discussion may be inferred from some of his head-lines in the table of contents, as thus: "A new energy is induced by quick locomotion; The sight of such success keeps effort alive; The nursing influence of motion; Express speed an unconscious tonic to the imagination; A widespread hopefulness of a peculiar kind begins," etc.

The pamphlet may, therefore, be called a plea for fast trains, and the author expressly declares that "only the good results of speeds are examined," leaving the injurious effects to the consideration of those more directly concerned.

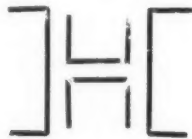
We suspect, if his object is to be extended to the use of high speed, he would have done better to discuss somewhat the economic side as well, for it is possible that a good deal of current notions as to the excessive cost of high speed is a relic of the old days of iron rails, loose couplings and similar mechanical imperfections. Except for the interference with movements of slower trains it is not probable that the cost of fast running alone, separately considered, is nearly as great as was once believed and taught, and to some extent even to-day.

The Mount Clare Shops of the Baltimore & Ohio Railroad.

These shops possess the double advantage of having been built in a large city and on an extensive piece of ground, and consequently there still remains plenty of room for future growth, and there is little of the crowding often found in the shops of old-established railroads, whose mileage and traffic have far outgrown the most sanguine anticipations of the original builders.

The Baltimore & Ohio Railroad manufactures many articles that are generally bought in a more or less finished state by other railroads. The company rolls its own iron at its works at Cumberland (Md.), and the Mount Clare shops work up the rolled iron into axles, etc., and make a large quantity of bridge work, all the wheels and axles used on the line, sleeping cars, and most of the telegraph and car-fittings which are generally made by private firms which devote their attention to these specialties.

Most of the shops were built many years ago, but some fine buildings have been recently added. Among them is a circular passenger car shop with a 60 ft. turn-table in the centre. The building is divided into 22 stalls, and as it measures 235 ft. diameter inside, the longest passenger or sleeping cars can be easily accommodated. The whole building is completely roofed in, and is very well lit by the central lantern or clear-story, some 80 ft. in diameter. The roof rises sharply from the outside walls to the base of the lantern, and is carried on lattice girders, which with the lantern are supported by wrought-iron pillars composed of two 9-in. and two 12-inch channel irons riveted together thus:



Wrought-iron pillars can often be used very advantageously in lofty shops. They take up less floor space than cast-iron columns, can be made considerably lighter and are more easily transported and erected, and in certain cases these advantages render the wrought-iron columns the cheapest. The lantern is trussed, a precaution which is very generally thought unnecessary, the sloping sides being treated as struts, whose thrust is counteracted by a ring at the base of the cone.

The great height and size of this remarkably handsome structure are enhanced by the tasteful manner and light color in which the interior is painted. At first sight, it might be thought an extravagantly large and costly structure to contain only 22 cars. But a little figuring will show that this is not the case. A rectangular building in three bays with a traverser down the centre aisle, and stalls right and left, enables each car to be moved without disturbing any other car, and in that respect gives similar advantages. A traverser, however, is not so easily moved as a turn-table, and would require a larger number of men to work it. The circular shed under notice gives a minimum clear space between cars of about 5 ft. 9 in. A comparison with a rectangular shed able to accommodate the same maximum length of car and giving a clear space of 6 feet between cars shows that the rectangular shed requires the smaller roof to cover it, the area being 9 per cent. less, while the four walls are 7 per cent. longer than the circular wall of the turn-table shed, each, of course, having the same number of stalls. It would therefore appear that when it is a question of housing about 20 cars there is little difference in the cost, while the circular form gives more available space for benches, etc., as a turn-table occupies a smaller area than a traverser, and therefore less room is wasted. This difference is more considerable than might be supposed, and the circular form gives more working floor space, in the proportion of about 13 to 8, when both sheds are full of cars and the space occupied by the turn-table in one case and the traverser-bed in the other is treated as unavailable.

The freight car shops have recently completed 300 eight-wheel coal cars of 40,000 lbs. capacity. These cars are of the well-known Baltimore & Ohio pattern, the bodies being formed of parts of three vertical cylinders of sheet iron with taper bases and drop bottoms. The trucks differ radically from those in general use, but are too well known to need description. While the same general design has been retained, the capacity has been increased to 40,000 lbs., 33 in. wheels, and the M. C. B. standard axle adopted, and a tender brake fitted, with blocks on all eight wheels. Some stock cars now building are fitted with the Loughridge air brake, which is used on all passenger rolling stock.

The locomotive shops are building engines at the rate of three per month, both Mogul and Consolidation engines being under construction at present. The former are intended for use on the less severe grades of the Trans-Ohio Division, and have 19 by 24 in. cylinders and 60 in. drivers.

The Consolidation engines have 20 by 24 in. cylinders, 50 in. wheels, and weigh 107,200 lbs. equipped for the road. Both classes of engine have the extended smoke-box and brick arch, which are now generally adopted on all main-line engines. The tires are bored $1\frac{1}{4}$ in. taper on the diameter, and secured by eight $\frac{3}{4}$ -in. transverse hook bolts, instead of the ordinary method of shrinking. It is claimed that a set of tires can be changed in two hours, without using a furnace, or destroying the paint on the wheels.

Several powerful shearing machines have been lately constructed, the main casting weighing nearly 20,000 lbs. Some steam hammers have also been made here, of the same general construction as those made by Messrs. Bement of Philadelphia, the thickness of the frame being, however, no less than $1\frac{1}{2}$ in.

The blacksmith's shop is nearly 500 ft. long by 75 ft. wide, but it has proved too small for the work on hand, and a temporary extension containing 24 fires has been recently started. The axles are made from bar-iron rolled at the company's mills at Cumberland, Md. Some six bars, 6 in. \times 1 in., form the pile, no cross piling being used. Two steam hammers and four large furnaces, each capable of heating a couple of piles, are used solely for making axles, the output of which is no less than 128 per day.

The locomotive frames are made in a somewhat unusual way. A great deal of trouble having been experienced from bad welds in the frames of engines supplied by makers, some pains have been taken to reduce the number of welds as far as possible, and place them where they can be easily made. The pedestal jaws and adjacent frame are worked out of a solid bloom, which is welded up from scrap at the end of a porter bar. This portion is then connected with the rest of the frame by welds in the plain part of the frame.

Most of the iron used in the blacksmith's shop is supplied by the company's rolling mills before mentioned. The output of these mills for March was no less than 5,000,000 lbs. The company purchase pig iron, and also use a large quantity of their own old wheels, which, being originally made of charcoal pig, should make good wrought iron.

The foundry is a comparatively small L-shaped building, which must be heavily taxed to supply 190,000 lbs. of castings per day. The portion devoted to car wheels is run on a double shift, 12 wheel-molders being employed in all, and producing 228 wheels per day. The wheels are annealed in plain pits, and are allowed to cool for four days. Each pit holds a dozen wheels, which are laid flat on top of one another, and the pit is covered with a sheet-iron tray, which is filled with sand to check too rapid radiation. An hydraulic crane has been lately introduced for lifting the wheels in and out of the pits. All wheels are gauged for diameter in three places to ascertain if they are circular, and both new and old wheels for passenger service are ground on the well-known machine for that purpose.

The bridge shop is a fine brick building finished during the summer of 1882. It is furnished with a hand crane of the pattern known as "Goliath" in which the crane travels on rails laid on the floor of the shop, the crane bridge being secured to legs, the bases of which are provided with wheels. As the span of the crane is about two-thirds of the width of the shop, this arrangement enables the remaining third to be devoted to machinery, the driving belts of which are quite clear of the crane. An Allen's patent portable pneumatic riveter is used, and is much liked. By means of a toggle-joint a moderate sized cylinder with a pressure of 65 to 70 lbs. of air can close a $\frac{3}{4}$ in. rivet, performing excellent work and nipping the plates close together. The riveter is slung from an overhead railroad by means of a pair of pulley blocks, and can thus travel the length of a chord or girder and can close either vertical or horizontal rivets. The air is supplied by a horizontal air pump with a fly-wheel and crank shaft, both steam and air cylinders being fitted with plain slide valves worked by eccentrics, the whole machine being exceedingly simple.

The bridge shop is now engaged on a large single-track bridge across the Monongahela River at Glenwood, near Pittsburgh. It consists of eight spans:

One through span of 300 feet.

One through span of 174 feet.

Six deck spans of 150 feet.

Other bridge work for the new line between Baltimore and Philadelphia is also in progress, comprising a large amount of iron trestle and bridge work.

The bridge shop is paved with oak blocks, the waste ends sawed off the sills of cars, forming a cheap and admirable pavement which wears well, can be easily swept and kept clean, and is not likely to damage or be damaged by anything dropped on it.

A large number of car furnishings, locks, door handles, bathhooks, etc., are made. The latter are first nickel-plated, and then covered with a thin coat of silver, the plating being effected by means of a Weston's dynamo machine, which is said to require less attention and take up less space than the batteries formerly used.

The tables in the drawing office are made in a very convenient manner. They are supported on two stout cast-iron pillars, and are mounted, like an ordinary swing looking-glass, on adjustable brass clips secured to the top of the cast-iron pillars. They can thus be tilted to any angle to accommodate the position of the draftsman, a ledge on the lower edge of the board preventing set squares, etc., from slipping off when the board is very much inclined. The tables, being hung more easily, accommodate themselves to the draftsman's position when leaning over the drawing.

The space between the different shops being in many cases considerable, the danger of a widespread, destructive fire is not so great as with more crowded shops, but the precautions taken against fire appear to be ample, and are some-

what unusual in character. Some of the employes form a fire brigade, and take it in turn to sleep above the engine house. The engine, however, requires no horses, as it is stationary, and the hose reel is a very light affair, easily moved by hand. The pressure of water is obtained by a powerful Blake pump with a 24 x 30 steam cylinder. This pump delivers into a system of fire mains laid throughout the works, and consequently on an alarm the pump is started, steam being kept up all night in one or the other of the stationary boilers for this purpose, and the hose is attached to the most convenient stand-pipe.

The Pittsburgh Locomotive Works.

These fine works which were originally built in 1867, are composed of remarkably solid and substantial brick buildings. All the work is done on the ground level, and the absence of upper floors renders the shops light and well ventilated. This is probably a more important matter than is generally supposed. It is possible for men to get accustomed to the evil odors and visible darkness which prevail in some machine shops and foundries, and breathe the chimney-like atmosphere of some blacksmiths' shops; but it is difficult to believe that work done under such conditions can equal in quality and quantity that produced where the surroundings permit the workers to make full use of their physical energies and senses.

Notwithstanding complaints as to the dullness of trade the capacity of these shops is being increased. The foundry, is to be entirely reconstructed, and enlarged to measure 240 by 80 ft. inside, while some additional ground taken in and leveled will give more yard room and better access to the railroad.

A new pattern store is just completed, and is, in many respects, a model building of its kind. It is built in two lofty stories, and is divided into six separate rooms by stout brick walls, the openings in which are closed by double iron doors. The floor of the lower rooms is formed of concrete, finished off with Roman cement. This material is employed to lessen the danger from fire, but it is obvious that seasoned patterns are exceedingly combustible, and having once caught fire, soon give out an amount of heat before which all ordinary "fire-proof" structures must give way. The subdivision of the building enables the fire to be more or less localized.

The patterns are stored on shelves carried by lofty standards, a system of light stairways and railed platforms permitting access to the upper shelves. Each range of shelves has painted on it conspicuously certain numbers; thus "5,000-5,500" signifies that all patterns with corresponding numbers are to be stored on this range of shelves. The shelves themselves are numbered in regular order; running along the edge are painted figures, 5,000, 5,001, 5,002, etc., so that each pattern has a definite location, and is assigned a special place on a shelf. In this way, any pattern can be found with the least possible delay. The man having charge of the pattern store keeps a book in which the issue and return of every pattern is noted. The shelves, etc., carrying the patterns are all painted white, which reflects the light and enables all the patterns to be clearly seen, even in the very subdued sunshine of an average Pittsburgh day, when a thousand odd chimneys are contending as to which can make the most smoke before the next shut-down begins.

The drawings used in the shops are of moderate dimensions, measuring only about 18 in. by 13 in. The blue copies kept for reference in the drawing office are bound in stout covers, and resemble externally so many ledgers. This appears to be an excellent way of keeping drawings together, and might often be used to advantage. The drawings are so bound that the numbers run consecutively, and thus it is easy to find any given number. Where one detail can be used for many classes of engines by altering only one dimension, the latter is indicated by a letter, and a little table on the drawing gives the proper length for each class of engine. Thus the reverse lever and reach-rod drawing will answer for many types of engines, the only alteration being in the length of the reach-rod. The right length for each class is shown in a table, which can of course be added to from time to time as new classes of engines are built.

These works turned out 92 engines last year, and when enlargements now in progress are completed, will have a capacity of about 120 engines of average size per annum. Fifteen engines for the Pittsburgh, Cleveland & Toledo Railroad have just been completed, comprising three six-wheeled switching engines, and some ten-wheel and American engines. A small four-wheel shifter, with saddle-tank, for iron works in Alabama, is just completed. Being of the 5 ft. gauge, it has to be loaded on a flat car for shipment. Several engines for the Central Ontario are awaiting the breaking up of the ice to be shipped to their destination. Some express passenger engines for the Terre Haute & Indianapolis Railroad are in the erecting shop, and will shortly be running fast trains. Several ten-wheel engines have been lately delivered to the Burlington, Cedar Rapids & Northern road.

Foreign Railroad Notes.

A German writer recommends the track watchmen, who are pretty thickly posted along the German railroads, to keep bees on the right of way.

Last January there were 518 miles of railroad under construction in Austria, on which 20,139 men were employed. More than three-fourths of the new mileage was state railroad.

The railroads in Austria are required to publish notices

of any rebates on freight charges, that they may be open to all shippers under the same circumstances. The number notified was 2,763 in 1881, 3,058 in 1882, and 3,552 in 1883.

March 1 the Belgian State Railroads began the practice of collecting the baggage of passengers at their residences experimentally, at three stations in Brussels, making a charge of 2 cents for every 10 kilometres (6¼ miles), with a minimum charge of 10 cents per piece of baggage, which is doubled when the baggage is received between 8 o'clock in the evening and 7 in the morning. It was intended to extend this service to the stations in Antwerp, Ghent, Lüttich, Ostend and Blankenberg.

The Italian railroads have had the following mileage and earnings for the last two years:

Miles	1883.	1882.	Increase.	P. c.
Earnings	6,004	5,913	91	1.6
Earnings per mile	\$40,571.102	\$38,044.143	\$2,526.959	6.6
	7,023	6,807	216	2.2

More than half the total earnings both years were by the Upper Italian system, which is owned by the state and which earned \$12,064 per mile.

About three-fifths of the mileage (4,204 miles in all) was worked by the state last year, but 582 miles of this were owned by corporations. The Sardinian railroads had the lightest earnings—only \$1,227 per mile. The greatest increase in earnings per mile were by the Roman (state) railroads—from \$6,251 to \$6,663, or 6.6 per cent.

The earnings per mile are not far from the average of the American railroads.

The electric head-light introduced in Austria some two years ago has turned out well enough to lead the Minister of Commerce to issue a circular to all the Austrian railroads, which says that the experiments made last fall with the lamps invented by Sedlacek and Wikullil have shown that its introduction, especially on local roads, would contribute not immaterially to safety in operation, so that the government could permit trains to run by night if provided with it, where otherwise it could not. And the minister authorizes the management of the State railroads to introduce the lamp, "provided the patentees grant a suitable reduction in the price asked."

This suggests that when all the roads in Prussia are owned by the State, the holder of a Prussian patent on a railroad improvement will have but one customer, and the difficulty of negotiating under such circumstances may be imagined.

In Russia very little provision is made for storing freight at country stations, and wheat is often piled up in the open air to wait for shipment, receiving great damage in case of rain. There is great complaint of the damage of goods by theft while thus unprotected at stations, and a special commission appointed to consider the subject has recently reported that railroad companies should be required to construct adequate freight houses; and, in order that this requirement may not be too burdensome on them, it is proposed that they be authorized to levy a special station charge of 11 cents per ton on freight, which, however, shall not apply to certain barreled and boxed freight, lumber, etc., removed in the time required by the way-bills. A special account must be made of the receipts from this station charge, and they must be devoted exclusively to building storehouses and for enlarging and building new freight-stations.

It is rumored that a project for a "Russian Pacific Railroad" is seriously considered by the Czar. The proposition is supported throughout by the example of the United States and the great development of wealth that has followed the rapid railroad construction here. Such a road would extend from Jekaterinenburg, the present terminus of the Ural Railroad, entirely across Siberia to Nicolajev, with branches to the Chinese frontier, etc. With this is united a project for a railroad from the east side of the Caspian at Astrachan to Herat, Persia, India and Central Asia. These lines would make about 14,000 miles, and cost about \$750,000,000, but it is proposed to give 20 years to building them.

It is probable that an equal expenditure on railroads in the grain country of European Russia, giving it a good outlet to the Black Sea and the Baltic, would be of much greater advantage to Russia than such an Asiatic system; and neither would be followed by such growth as there has been in this country, because it is the character of the population as much as the railroads that has caused the growth here, and Russia must be developed by Russians, who are very far from utilizing the resources which are already available, and which should enable them to supply all Western Europe with grain without help from America, India or Australia.

In the discussion over the Prussia State Railroad estimates in the Prussian Diet a delegate called attention to the fact that the state estimated the cost of rails at \$40 per ton (of 2,204 lbs.) at the works, while in the last half of last year in many cases German works had sold rails for export at \$21.25, while charging from \$34.75 to \$36.50 for rails to be used in Germany, where there is a duty of \$6.25 on foreign rails. This delegate said the cause was a combination of German rail-makers, and he intimated that there was a similar combination among German car-works. The administration, he said, must know of these combinations, and he asked what it was going to do about it. He gave it as his opinion that either foreign competition must be permitted or that the state must establish its own rail works. The latter would seem to be the natural result when the railroads are all in the hands of the state, as it will then be

the sole customer of the rail works, and there will be no competition to fix prices.

Another delegate said that the \$21.25 per ton received for some foreign contracts was about \$2 less than the cost of manufacture, including general expenses and interest on the investment in the works. He estimated the consumption of Germany at 200,000 tons yearly (equal to about 9 tons per mile of road, but not more than 5½ tons per mile of track, which is equivalent to a renewal once in 18 years.) The capacity of the German works he estimated at 500,000 tons per year. Krupp's works alone can produce all that Germany can consume. He defended the great reduction in price made to secure foreign contracts, as thus only could the works be kept in operation.

The career of another German (Austrian) railroad officer of repute who recently died was as follows: Emil Tipl, at the time of death "Central Inspector" of the European Ferdinand Northern Railroad of Austria, born in Bohemia, graduated from the Prague Polytechnic School in 1850, and immediately entered the service of the Southeastern line of the Austrian State Railroads in its workshops, becoming practically experienced in all branches of shop work. From 1853 to 1855 he was in the train and machinery departments of the Southern (state) road, and then entered the service of the company, which bought the Austrian State roads, and two years later went to the Empress Elizabeth road, which was then under construction, and had much to do with the organization of its locomotive service and the construction of its rolling stock. When the road was opened he was put in charge of its shops in Vienna, where he soon attained the reputation of a prominent, theoretically and practically trained engineer of railroad machinery. In 1872 he was put at head of the locomotive department of the European Francis Joseph Railroad, and later took charge of the whole transportation department. Here he introduced several improvements, and yet found time to contribute largely to technical literature, was much employed as an expert and arbitrator in questions involving railroad engineering, often by the government. In 1880 he was appointed to the place of "Central Inspector" of the Emperor Ferdinand road, which he held when he died, when he had just been authorized to act in the place of the General Inspector. Among Tipl's works are the following:

Rolling Stock and other Material for Railroad Operation (Official report on the Vienna Exhibition).

Manual of General and Special Requirements for Services and Supplies for Railroads.

The Locomotive Department in Practice.

There died recently in Germany Mr. Ernst Fleck, President of one of the state "railroad directories," to which is entrusted the working of 1,000 to 1,800 miles of road, and who, therefore, may be classed as holding a position something like that of President Rutter, of the New York Central; Newell, of the Lake Shore, or Blackstone, of the Chicago & Alton. His obituary speaks of him as "one of the most eminent of Prussian state railroad officials." It is, therefore, interesting to know what was the training which had brought him to such a position comparatively early in life. (He was 46 when he died). It seems that he was a son of a Prussian official (a "general auditor"), was attached to the judicial service for five years as "referendary," and then for two years was Chancellor at the Prussian Embassy to Constantinople. From this legal and diplomatic service he entered the state railroad service directly as member of a railroad directory (which always, apparently, includes some jurists). During the French war he served as Chairman of a staff appointed to work lines in France for the army, and after the war was appointed a member and Vice-Chairman of the directory of the Main & Weser Railroad, but was soon called to the administration of the railroads of Alsace-Lorraine, which had been bought of the French companies owning them, and were owned and worked by the German Empire (not by any country in the Empire). In 1873 he became an assistant in the Imperial Chancellery (not in railroad service), and in 1877 was made Chairman of the directory working the Upper Silesian Railroad (then a corporation railroad) which with a change in title and in the system of roads under him was substantially the place occupied by him at his death, when he was "President of the Breslau Royal Railroad Directory," which was only established March 1 last. He is spoken of as an extraordinarily capable man, active and devoted to the interests submitted to his charge, gracious and just to his subordinates and in his relations with the customers of his roads.

The effects of some attempts of the Prussian government to prevent "discriminating rates" are related by a committee of the Berlin & Hamburg Railroad as follows: About 1878 the government required that all rates made on imports into Prussia or shipments across Prussia to other countries should be submitted to it for approval before going into effect; and the government refused to approve them if it thought any domestic interest would be injured thereby; and the influential land-holding class were very decided in their convictions that anything which tended to increase the imports of grain, provisions, etc., very seriously affected a domestic interest, while the government, the chief owner of the forests, looked unfavorably on rates which made it easy to import timber, either from the shores of the Baltic or from Austria and Hungary. They were interested in having the prices of these staples as high as possible. The transit traffic of the Berlin & Hamburg Railroad was much affected, as it was one of the principal

lines of communication between the Baltic and Austria-Hungary. There is great competition for this traffic, for not only are there other Prussian roads and ports, and roads from Dutch and Belgian ports, but also roads from the Adriatic which give Austria-Hungary a route to the sea. Petroleum and cotton, for instance, may be imported either by way of Trieste and Fiume, on the Adriatic, or by Antwerp, Rotterdam, Hamburg or Bremen. Further, when the Prussian government refused to permit the Prussian railroads to make rates low enough to enable them to get this transit traffic, the Austrian roads established a connection with the Elbe River, which was made navigable for small vessels to the border, and the government could not prevent these making as low rates as they pleased. The consequence has been that the transit traffic has not been stopped or reduced, or the rates on it increased; and that imports come from Austria-Hungary at as low rates as ever, and compete with Prussian products, but are carried by river instead of by rail, and that the Prussian railroads do not get any support from this traffic—that is, from the part diverted, for of course there are many kinds of goods that continue to go by rail, the rates of freight having little effect on them. What the result was on the Berlin & Hamburg Railroad is given by its committee as follows: The Austria-Hungary traffic yielded it \$448,000 in 1878; in 1882, \$214,000—a decrease of 52 per cent.; and in the first three-quarters of 1883 the earnings from this traffic fell off \$65,000 more.

The price that the Prussian government last offered for the Berlin & Hamburg Railroad was equivalent to 42½ per cent. of the par value of the stock. It agrees to pay 16½ per cent. on the stock, besides 60 marks in advance for every 600 mark share, and within a year will issue Prussian 4 per cent. government bonds to the amount of 4,950 marks for every two shares of the stock, which will yield precisely 16½ per cent. on the face of the stock.

This road was opened through between Berlin and Hamburg in 1846. It has several branches, and in all owns 270 miles of road. It has a funded debt of about \$12,000,000 and a capital stock of \$2,250,000—\$8,000 of stock and \$44,000 of bonds per mile.

The development of the traffic of the line from 1847, the first year the road was open through, may be traced below:

	Passenger-miles.	Ton-miles.
In 1847.....	21 millions	10 millions
" 1857.....	27 "	46 "
" 1867.....	42 "	61 "
" 1877.....	58 "	142 "
" 1882.....	76 "	99 "

For the first two years no dividend was paid by the company; in 1849 and for four years thereafter, 4½ per cent. was paid; in 1854 and 1855 5 per cent.; then the dividends fluctuated, but generally rose, until they reached 7¼ in 1863 and 10 in 1864; then 9½ for four years, and since 1868 never less than 10 per cent., while for the last five years they have been, respectively, 10½, 12½, 14½, 17½, 19½. As the state has to pay what is equivalent to the average dividend for the last five years, the 16.9 per cent. offered is equal the average if the dividend for 1883 amounts to 20¼ per cent. The shareholders' committee, however, seem to think that their dividends were not as large as they ought to have been, for they say: "We have no doubt that the state will make a brilliant bargain by buying the road at the price offered, as the state railroad administration naturally can utilize it much better after consolidating with its great system than we ever could in our isolated position, oppressed by the competition of the state railroads, with their monstrous power." A little oppression of the same kind, resulting in a steady increase of the dividend from 10½ per cent. in 1878 to 19½ in 1882, would be welcomed by almost any railroad in this country. Nevertheless the competition of the state roads and water competition had a serious effect on the freight traffic of the Berlin & Hamburg road, and its freight earnings decreased no less than 40 per cent. from 1877 to 1882, and this was almost wholly in freight interchanged with other roads. Since the government has now more than ever the connecting roads in its own hands, and has power to divert a very large traffic, the committee of the company recommended the stockholders to accept the government offer. Later news is that the Berlin & Hamburg accepted the government offer with but one dissenting vote.

The immense power which the Prussian state railroads have over the few remaining corporation railroads is illustrated by facts related by a committee of the chief remaining one of the latter, the Berlin & Hamburg. The latter road was formerly the chief connection between Hamburg and the Saxon railroads. This traffic was brought to the Berlin & Hamburg by the state railroads, but formerly was delivered at Berlin, so that it hauled it the entire length of its road. But the state had a line of its own which connected with the Berlin & Hamburg at Wittenberg, which is but 99 miles from Hamburg, while Berlin is 178 miles distant. This makes a line of nearly the same length as the Berlin line, but it is largely a single-track line, and otherwise less effective, as was shown by the fact during a month the average time of shipments was 40 hours via Berlin and 26½ hours via Wittenberg (the distance is about 265 miles). The state roads turned the Saxon traffic over this route. The above average time of freight on the road was complained of, but after nearly a year's service by the new route, last January only 45 per cent. of the shipments from the Saxon border to Hamburg, 265 miles, went through in a single day, and 31 per cent.

were more than two days on the road, while 64 per cent. of the shipments by way of Berlin went through in one day, and only about 1 per cent. were more than two days on the road. By this shortening of their haul on the Saxon traffic the Berlin & Hamburg lost \$69,450 in the first nine months of last year, besides the loss which may have resulted from the diversion of traffic by reason of the less favorable time of forwarding shipments, decreasing the Berlin & Hamburg's advantages over other roads.

Further, in cases of special rates made to or from competing points on the Berlin & Hamburg, over a route including parts of the state lines, the latter claim the right to charge for their part of the haul their full regular rates, though they make the same special rates in connection with other state lines to and from the same places—a practice which is expressly forbidden in the recent charters to Prussian railroad companies. This makes it possible for the state railroads to cut off the Berlin & Hamburg entirely from some important through traffic.

Again, the committee complains that their company has had obstacles put in the way of its competing on fair terms with the state roads. There was a rule that in case a special reduction of rates should be necessary for any export or other traffic it should not be put into effect until the authorities had approved it and submitted it to the managers of the competing routes, so that they might all make the same reduction at the same time. But about the end of August last the Berlin & Hamburg officers saw a notice in the public papers that after Sept. 9 from the Berlin and other state railroad stations, on spirits carried to Hamburg for export, a considerable rebate would be paid, equivalent to putting the spirits in a lower class. The larger part of this traffic had gone by the Berlin & Hamburg, and it at once applied for permission to make a similar reduction in its rates. But various obstacles were put in the way of granting this application for the whole of the traffic, and it was not until Jan. 24—nearly five months after the state railroads had announced their reduction—that the Berlin & Hamburg could announce it! Knowing that the application must eventually be granted the management ventured to notify shippers that there could be no doubt that they would be able to pay the same rebates as the state railroads were paying, but the Prussian authorities declared that this could not be permitted. In view of this the committee say: "It must be remembered that in this case an especially important traffic was concerned, which previously had gone chiefly over the Berlin & Hamburg road. These circumstances must have been perfectly well known to the Prussian state railroads, since the traffic in question was shipped at the state railroad stations. Further, this matter was not involved in any practical difficulties or differences. If, in spite of this, the supervising authority was not able to approve our application for the rates in question, though finally recognized as legitimate, until nearly five months had passed, and if we are to be forbidden to avoid the financial disadvantages that necessarily result from such delay by provisional regulations, it is plain that we are in a position of uncertainty as to our rights, which scarcely admits of even an approximate estimate of the evils that threaten the future of the undertaking." Exactly so. The position of a fat little road entirely surrounded by the great system of another management, whether state or company, is like that of a fat sheep in a lion's den. It will be swallowed wherever it suits its powerful neighbor's convenience. The Berlin & Hamburg committee consequently recommends that the stockholders accept the government's offer for their road.

Contributions.

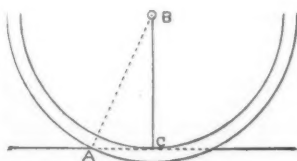
Elevation of Outer Rail—Facts Favoring High Elevation.

SUSQUEHANNA, Pa., April 14, 1884.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of March 14 I find a letter under the above heading. I had come to the conclusion myself, from the study of flange friction, that our formulas were wrong.

If we examine the action of a truck passing a curve we shall find, as you say, that the flange of the front outer wheel grinds against the rail, owing to the tendency of the truck to run in a straight line. The pressure which causes this grinding is just sufficient to change the direction of motion of the truck.



If we examine the action of flange friction we will see to what extent it can influence train resistance and rail elevation.

In the figure, suppose the flange comes in contact with the rail at some point A, then we have the pressure against the rail at A = P multiplied into a coefficient of friction f , = the force necessary to apply at A to overcome this friction.

This force Pf multiplied into $\frac{AC}{BC}$ (= the ratio of the distance between the point of contact of railroad flange (A) and rail and tread (C) to the radius of the wheel) gives the

force necessary to be applied at B to overcome the flange friction. Making this force = R , we have:

$$R = Pf \times \frac{AC}{BC}$$

[Our correspondent's formula for flange friction is here in error and should read:

$$R = Pf^2 \times \frac{AB}{BC}$$

for this reason—the force pressing flange against rail is Pf , which, again multiplied by the coefficient of friction f , gives Pf^2 as the flange friction. This is overcome by the wheel acting as a bent lever ABC , in which C is the fulcrum, B the power, and A the resistance to be overcome. The formula for flange pressure, Pf (which is applied immediately below C), requires no correction whatever.—EDITOR RAILROAD GAZETTE.]

When the rail is given an elevation greater than that necessary to counter-balance the centrifugal force c , the horizontal component of the weight of the car, being applied at the king-bolt and acting toward the centre of the curve, tends to force the flanges of the inside wheels in contact with the inner rail, thus tending to relieve the pressure P against the outside rail.

It may be claimed, however, that the pressure against the outer rail, when relieved in this way, will be transferred to the inner rail; but this cannot be, owing to the tendency of the whole truck to run away from the inner rail, thus reducing the pressure between the inner rail and flanges. This tendency can best be overcome by a force acting on the king-bolt and not on the outer forward flange.

Working values for the elevation of the outer rail can be readily determined, either by wedging up the outer rail and observing the action of the flanges or by means of a dynamometer.

L. S. RANDOLPH.

[Mr. Randolph is, perhaps, a little too hasty in concluding, on a theoretical basis alone, that decisions reached in a similar way in favor of low elevations are erroneous. It may be so. There are certainly plausible grounds for thinking that it is so; but there is no existing experimental evidence of a trustworthy character tending to prove either position—a fact much to be regretted. The cheapest and most satisfactory test would be to select some tolerably sharp curve in a hollow, test it at a low elevation by dropping down a considerable number of freight and passenger cars, so as to get a fair average, noting how far they ran on the up grade by their own momentum; then increase the elevation to not over 8 in., and test an equal number of cars again the same way, both track and cars being as nearly as possible in the same condition.]

Such a test as this would cost little; would settle, or help to settle, a very doubtful point, and be a real and much needed contribution to practical railroad work. Nothing like it has ever been done, so far as we know.—EDITOR RAILROAD GAZETTE.]

The Trustworthiness of the Harkort Tests of Girders.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Having read in the *Railroad Gazette* of March 31 an article by C. L. Strobel, Esq., on tests with one iron and one steel girder, in which reference is made to the abstract of the Harkort experiments with 32 steel and iron girders, published in the *Gazette* Jan. 26, 1883, I feel compelled to correct several remarks made by Mr. Strobel. Mr. Strobel has no authority to consider the results of the 32 experiments as improbable, except his own personal, however valuable, opinion, which in my judgment is not qualified by any reason, so far as can be drawn from his article.

Those experiments were not made by manufacturers for certain purposes, but were made by the Dutch Government engineers with lever-testing machines, in the presence of prominent and scientific engineers of the Harkort Works, of the establishment of Mr. Krupp and of the Dortmund-Union—hence by men of the highest technical attainments and of undoubted honesty. The original protocols were signed by all these gentlemen.

I myself have given in the abstract published by the *Railroad Gazette* the results as conscientiously as possible, and since I have no personal or pecuniary reason whatsoever to prefer one material to another, I can assure Mr. Strobel and the readers of the *Railroad Gazette* that there was no motive why I should endeavor to represent the experiments otherwise than as they are given in the original protocols.

Mr. Strobel says: "Steel is a material so variable (sic!) in its qualities that such results can be obtained with it, but no evidence can be found that such was the case with these girders."

Why this is giving a blow directly in the face of truth!

The Harkort girders, No. 8, 10, 30, 7, 3, broke with 45,500, 47,000, 44,500, 32,700, 25,600 lbs., though the steel of which they were made bore 86,800, 100,300, 95,200, 105,200, 106,000 pounds per square inch! These figures were given by me in the abstract. Is there no irregularity? And yet No. 8, 3, 10 and 7 (of which No. 3 stood less than Brunel's girder, the most miserable iron girder ever tested or known, and less than must be expected from really good cast iron), were girders taken from those of the Nymwegen bridge. Mr. Strobel makes an entirely gratuitous remark when he blames the Dutch engineers for want of proper inspection and precautions "as regards manufacture and inspection."

I can assure him that nowhere in the world have I found that engineers make stricter specifications or more to the point at issue, and are more exacting in inspection. They live at the bridge works; they test without intermission, and are controlled by their superiors in Holland, who also make tests on the same material. It is only the German works that dare contract for bridges in Holland. Manufacturers from other countries have tried the thing, and have either commercially failed, or have, at least, severely burnt their fingers.

I can assure Mr. Strobel that the Dutch engineers have some little experience as regards steel, for they used steel in gigantic bridges at a time when cast-iron was still in exclusive use for compression members of iron bridges in the United States.

Nor is the above irregularity of the results on riveted steel work such a new thing. The boilers of the "Livadia," built for the late Czar Alexander II., gave most startling results, and these experiments are of more recent date than the Dutch experiments.

Experiments made with specimens manufactured on purpose give one result, and experiments made with specimens selected at random from bridge girders, such as 15 out of 32 of the Harkort specimens give other results.

So far, then, the latter, besides being over six times as many, are more trustworthy than those reported by Mr. Strobel.

It is true that only pieces of the webs and cover-plates or flange-plates of the broken Harkort girders were tested, and none of the angles. But there is no harm in this, because the angles were made of the same material, and because the cover-plates and plates generally must be considered *a priori*, to yield first. Besides, since the three iron girders were treated in the same manner as the steel girders, the experiments are equally good for comparison of the different classes of material. Moreover, in the Harkort experiments the test pieces were cut at spots where no strains beyond the elastic limit can be expected. Now the five keystone experiments, so far as they go, entirely prove that there is no reason for assailing this method of testing iron specimens (not strained beyond the elastic limit) after the girder tests are made, to wit:

The average strength with specimens of material for girder No.	1	2	3	4	5
was before the girder tests were made.....	52,050	101,600	61,800	81,800	80,250
and the pieces after testing gave.....	43,500	98,500	60,250		

If anything, material after it has been once tested is stronger than before, as regards the ultimate strength. But here the second line of results gives less. Here the material was not affected by the previous testing of the girders.

No, it is not the Harkort experiments which are doubtful, but the interpretation of the five tests in Pittsburgh by Mr. Strobel is doubtful.

The average strength of the iron is given as 52,050 and 43,500 lbs.; but the tested girder gave 58,000 lbs. of ultimate strength, or from 11 to 33, and in the average 22 per cent. more. How is this more to be accounted for? Must we believe that the Pittsburgh process of punching holes and nailing the iron together increases its strength by 22 per cent?

On the contrary, most probably the small specimens were tested in a small lever machine, or being small in section and tested in a hydraulic machine gave nearly correct results.

On the other hand, the girders themselves were tested in a large hydraulic machine. Is this a machine where the strain is measured by a trustworthy combination of levers, or one whose pressure is measured by a mercury gauge? Now, I recollect that some 14 years ago Phoenix as well as Keystone columns were tested both in Phoenixville and in Pittsburgh, and that the late Mr. John Griffen told me that the results of both these kinds of members were 10 per cent. better in Pittsburgh than in Phoenixville, and that the Keystone machine, not being used so frequently as the Phoenix machine, had 10 per cent. more friction.

Some such reason must exist, for it is incredible that iron-riveted girders with their thin webs should give higher ultimate strength than the metal from which they were built. And if this is admitted we have to deduct from 11 to 33 per cent. from the other results, and we arrive at pretty nearly the same ultimate result as is given by the Dutch experiments.

These also showed some good results. For instance, the two girders made of medium steel and with turned tapering bolts gave 69,500 lbs. in the average. The 15 girders of the same class of steel had an average strength of 50,900 only, against 57,900 of the three iron girders, or against 50,300 lbs., of the excellent Krupp homogeneous steel expressly procured for the purpose. Among those 15 girders with the low average strength there were others of 69,700, 67,000, 84,000, 68,000 lbs., or together 35 per cent. more than given by the iron girders. The three girders made of hard steel gave 86,300 lbs. An interpreter like Mr. Strobel would have considered them as conclusive if given alone.

Mr. Strobel asks with some show of astonishment why the Harkort experiments have not received more attention. He hints that it is because people do not believe in them. This is not the reason.

In Germany as well as in England, in the United States and elsewhere, there exists a powerful combination of the steel interest, and it seems that nobody dares to publish anything but what is good about steel. The German iron papers delayed the publication systematically.

Ingot iron must be called steel to sell it at a higher price. When once those combinations are dissolved we shall hear the whole truth about steel, and not what is favorable only.

I for one believe that good iron is still good enough for most bridges. At present I am building a 360 ft. cantilever railroad arch bridge, with five hinges, to be erected without scaffold, of which Sir Thomas Tancred, one of the contractors of the steel bridge over the Forth, is Consulting Engineer. I use wrought iron of 51,500 lbs. strength, and all tensile joints are to be made with turned tapering bolts, and all holes are being drilled and rimmed besides. I use 8-in. channels of ingot iron (80,000 lbs. per square inch) in the vertical columns, only because channels of good iron, being little asked for, are not easily obtainable in the market, and I strain that "soft steel" no higher than the iron, that is in consideration of the length of the members only up to two tons per square inch.

That steel eye-bars, if properly made and properly annealed, can be excellent tension members, or that steel used for compression members may have advantages, I think probable; but I have a great distrust as regards experiments made by those alone who have an interest that the results should be good.

In my judgment, the real superiority of steel for bridges, if any, over good iron, has still to be established by numerous systematic and scientific experiments on a large scale, prepared, executed and interpreted by a commission of scientific as well as experienced experimenters of serious authority.

However, I learn that the Dutch experiments are to be repeated in Germany, and when they are made I shall endeavor to lay the results before the American railroad engineers, through the medium of the *Railroad Gazette*.

C. B. BENDER.

LONDON, April 2, 1884.

TECHNICAL.

Favorable Reports on the Gibbon Boltless Rail Joint.

We have elsewhere condemned certain "tests" of the Gibbon rail joint as shams. This condemnation, it should be understood, is aimed at the tests, and not at the joint, which we have not pretended to discuss. Let some may attach the opinion expressed of the tests to the joint tested, we publish below certificates favorable to the joint by railroad men who have used or examined it.

H. Patterson, Supervisor of Tracks, of the Delaware & Hudson Canal Co., writes at Albany Jan. 31, 1884:

"The 'Gibbon Boltless Rail Joint' has been successfully tested and is now in use upon the track of the Delaware & Hudson Canal Co.

"As soon as the weather permits, we shall lay more rail and use this joint.

"It is with pleasure I certify that in places where rails become worthless from battered ends in using the fish-plate or angle joint, this joint becomes especially valuable as a substitute for them, rendering it unnecessary to remove the rail and therefore possesses an increased value as a saver of rails."

Thomas B. Purves, for 30 years Division Master Mechanic, Boston & Albany, writes at Albany, Feb. 6, 1884:

"This is to certify that I have this day, in company with J. White Sprong, Secretary Delaware & Hudson Canal Co.; E. A. Pearsall, of Coventry, Chenango County, N. Y., and Wm. Headlam, Jr., Agent for the Northwest of the Gibbon Boltless Rail Joint Co., carefully examined the successful application of the Gibbon Boltless Rail Joint to the track of the Delaware & Hudson Canal Co.

"I have read the certificate of H. Patterson, Supervisor of Tracks of said company, and for 20 years or more Track-Master of railroads centering in and around Albany, N. Y. Mr. Patterson accompanied us in our investigations, and says that the joint has been successfully tested in the tracks of the Delaware & Hudson Canal Co., during a five months' test; that no joints have been broken since laid in the track; that it is impossible for the rail to spread where the joint is applied; that the rail cannot creep with this joint; that it has an increased value as a saver of rail over the ordinary fish-plate or angle joint where the rails become battered down at the ends, and that the expansion and contraction of the rail is confined to each rail separately. From our examination it would seem to me that Mr. Patterson's claims are well taken."

The following are among the favorable notices (no others have reached us) which have appeared in various technical papers.

The *Railway Review* of March 28 last said:

"In tests and actual service the joint has met its claims and shown itself well adapted to insure a strong joint, the solidity of a continuous rail and absolute freedom from low joints. * * * The following are demonstrated facts:

1. No repair has been made since the joints were laid. 2. It makes a smooth and continuous track. 3. It removes (absolutely) low joints. 4. The track cannot creep. * * * and the joint cannot spread. * * * 5. It removes all labor of low joints and loose bolts and utilizes rails which are battered at the ends. * * * 7. It saves 1,500 lbs. of steel rail to every mile of track. 8. The joint is made of Bessemer steel and cast direct from the converter, so that there is uniformity of wear of joint and rail. 9. It must preserve the life of the rail several years, on account of removal of low joints and loose bolts.

"The joint (as shown by the test sheets) is 25,000 lbs. stronger than the rail itself."

The *Railway Age* of March 31 said: "A personal observation of it is a practical operation enables us to say that it seems to be all that is claimed for it. Altogether the result of practical tests seems to fully bear out the claims made for it as forming a continuous rail without low joints and preventing spreading and creeping of track."

English Railroad Notes.

A correspondent writes that unusual precautions are being taken against any further dynamite demonstrations on English railways, the recent explosion at Victoria station, and the discovery of combinations of dynamite, pistols and clocks in the cloak rooms of other London railway stations having put all classes of railway men on the alert. Private detectives have been employed at all the principal stations, and every piece of baggage in the cloak rooms opened and subjected to a strict scrutiny, while officials in charge of the "left baggage" rooms refuse to accept any package which they deem suspicious. This naturally causes much inconvenience, especially to Irish Americans. Though much glass was broken at Victoria station a suspended gas-lamp was left uninjured, though close to the scene of the explosion.

Various forms of electric lighting are being tried on the cars of the Brighton, the Great Eastern and the Metropolitan District railways, and the traveling public seem to be much

pleased with the brilliant and steady light afforded. Whether the results will be equally satisfactory to the pockets of the shareholders remains to be proved.

The Pintsch system of lighting cars is becoming more generally used in Great Britain. There are now 1,804 cars running with the light and 458 cars are being fitted. The total number of cars used exclusively for passengers was at the end of 1882 no less than 31,250, and in addition there were nearly 12,000 baggage, combination and other cars run on passenger trains. It is probable that the companies are waiting for a cheap and suitable form of electric light. The ordinary style of roof lamps in use is most objectionable, and though the first cost of the Pintsch gas reservoirs, etc., is considerable, a remarkably steady light, unaffected by the most violent wind or oscillation, is obtained at the cost of the broken glasses of the old system.

Compound engines are being built for the Great Eastern and the Brighton railways, the latter being for freight service. An engine on this principle is also being designed for use on the Indian State lines.

The Midland Railway is building some large four-coupled express engines. The cylinders are inside, and measure 19 in. by 26 in., with 84 in. drivers and 42 in. truck wheels. The engines weigh 94,000 lbs., and the tenders, which carry 3,600 gallons, 78,000 lbs. Mr. Johnson, the Locomotive Superintendent, contemplates also building some single-driver express engines with the same sized cylinders.

Messrs. Beyer, Peacock & Co., of Manchester, are building some consolidation engines for a South American line of standard gauge. Cylinders, 18 by 24 in.; drivers, 46 in. diameter; pony truck wheels, 33 in.; driving-wheel base, 13 ft.; length of main connecting-rod between centres, 8 ft. 6 in.

Another attempt is being made to use steel in place of copper fire-boxes, and so far with perfect success, an express engine having been running heavy trains for the last six months. Hitherto steel has not proved a suitable material, but as copper appears to have deteriorated in quality of late years, and does not now give such satisfactory results as formerly, it seems desirable to try the cheaper metal.

A Lilliputian Locomotive.

A small locomotive, claimed to be the smallest in regular service in the United States, is now in use at the Central Wharf Railroad Shops, Pensacola, Fla., designed by John Douglass, Master Mechanic. The engine is of 20-in. gauge; cylinders, 5 in. by 8 in.; driving wheels 12 in. diameter; wheel base 7 ft. 9 in. The boiler is 2 ft. 8 in. diameter, and has 97 flues 1 1/4 in. diameter. The tank carries 180 gallons, and the coal bunkers 250 lbs. The whole machine is 9 ft. 6 in. long, 4 ft. 6 in. wide by 4 ft. 3 in. above rail, and weighs, in working order, 3 1/2 tons.

A novel feature is the mounting of the main frame upon two four-wheel trucks, one being the driving truck, which is connected to an intermediate axle hung in the middle of the frame with a special bearing, so as to allow the driving truck to move around its centre to adjust itself to the irregularities of the road. This arrangement gives great freedom in passing the sharpest curves, and a steady motion at high speed.

The engine pulls 15 loaded cars, weighing about 45 tons, and handles them easily. A pressure of 80 lbs. is carried, and the valves cut off at 3/4 stroke.

Wood and Iron Rails for Logging Railroads.

It is within comparatively a few years that railroads have been introduced for hauling logs in the Northern pineries, some use having been made of them earlier in the South, where lack of snow made it more difficult to get the logs to the mills. Since that time they have been used very extensively in Michigan and Wisconsin, but the use of wood for rails has been generally abandoned. The *Northwestern Lumberman*, in answer to an inquiry, states as follows the objections to such roads:

"The objections to pole roads are many, the most convincing of which is that no live operator was ever satisfied with one of them, and all having made a change from wood to iron rails speak in the most decided way in favor of the latter, both as regards cheapness and efficacy. A member of a Chicago firm operating in Tennessee recently told a representative of the *Lumberman* that the firm would have been \$10,000 better off had it laid iron rails to start with instead of wooden ones. Repairs on a wooden road must be constantly made, which involves a great deal of labor. The power of a locomotive is much less on wood than iron; it is stated by locomotive builders that the power is but a half or two-thirds as great, but it is probably not that. A Mississippi gentleman states that the same locomotive that drew but one car of lumber on wooden rails now easily draws six on iron, to say nothing about the difference in the time required for a trip. On wood he says the engine was off the track often, but that since iron was substituted, two and a half years ago, it has not been off but once, and that was owing to a wash-out. Messrs. H. K. Porter & Co., of Pittsburgh, Pa., extensive manufacturers of locomotives for logging roads, say: 'We do not advise wooden rails unless nothing else can be had. Wood will answer for a temporary track, and under favorable circumstances may earn enough to pay for T iron before it is entirely worn out. It is not adapted for a permanent track and soon becomes dangerous unless kept in constant repair. In almost every case within our knowledge where locomotives have been used on wooden rails, iron rails have been substituted. The principal exceptions have been in the Southern lumber districts where, the grades being easy and the loads small, lighter engines are used and the track repairs are not noticeable, because the track is constantly shifted to reach other places. Even here, although the work is done by the locomotive much better and cheaper than by animals, an iron rail would be a great improvement and more than worth its extra cost. Generally, we would dissuade any one from laying a wooden rail. To do any considerable business on the very best wooden road that can be built will, in the words of one of our customers who has tried the experiment, 'require a very rich concern.' Parties using animal power for hauling on a wooden rail, if content not to greatly increase the load, may effect a very considerable saving by using a locomotive; but for transportation on a scale of any magnitude, wooden roads are very unsatisfactory and almost impracticable.' Users of pole roads substantiate Messrs. Porter & Co.'s statements. At present iron is so cheap that there is little excuse for using wood. If wood is used, however, maple is the best. In the South the rails are generally made of heart pine."

When such snows fall as we had last winter the telegraph and telephone people wish that their wires were under ground, a wish which the rest of mankind cherish at all times. In Armenia there is an additional reason for the wish on the part of the electricians. The Armenian women are renowned as the cleanest in Turkey, the Dutch of the East. They are at the wash tub all the time, and when they have washed a batch of clothes they hang them on the telegraph wires to dry. Snow-white and damp cloths, even when well wrung out, are as heavy as snow itself, and the result can be easily conjectured. The constant necessity for repairs, arising from this inconvenient domestic use of the wires, causes great trouble and expense, it is said. It would

New Use for Telegraph Wires.

seem, however, that this could easily be avoided by using poles long enough to put the wires quite out of reach of the thrifty Armenian ladies.

A Crooked Piece of Railroad.

The extension of the Nevada Central Railroad from the valley of the Reese River up Pony Cañon through the city of Austin, Nev., is about 2½ miles in length, in which distance there are employed over 40 different curves, varying from 2 degrees to 40 degrees. The grades vary from level to 8 ft. per 100, and in a distance of 10,300 ft. an elevation of 636.25 ft. is attained. To overcome this elevation within the above distance it was necessary to resort to one switch-back, and 20 ft. between centres of track a difference in elevation of 75.5 feet was acquired. The use of such excessive curvature was made necessary by following an old wagon road cut in the rock on the precipitous side of the Cañon. Considering the resistance of the curvature on this, it is thought that it encounters the steepest grade of any road now in operation in this country, upon which steam is used, applied through friction.—*St. Louis Republican*.

Basic Steel for Boiler Tubes.

The American Tube & Iron Co., of Middletown, Pa., has been making experiments upon the use of basic Bessemer steel for boiler tubes, with the most satisfactory results. We have recently seen some test samples of these tubes which have been subjected to very severe tests while cold, having been flanged, buckled and flattened without giving any evidences of weakness. The basic steel used in the tubes is entirely of domestic make, being supplied by the Pennsylvania Steel Co. The experiments made with the English or foreign basic steel were unsatisfactory, as the steel was harder and difficult to weld properly, although when finished it was found to be quite ductile. The greater hardness of the English steel is due to its being higher in carbon and phosphorus, analysis showing the carbon to be about 0.08 per cent., while in the American it is hardly more than a trace. The phosphorus in the English basic is about 0.14 per cent., against 0.02 to 0.03 per cent. in the American, while the manganese is practically the same in both, being about 0.3 per cent. Though the steel tubes are more expensive than wrought-iron ones, their superiority warrants their introduction.—*The Metal Worker*.

English Ship-Building.

The tonnage built in Great Britain during 1882 and 1883 was as follows:

	No. ships.	Tonnage.	No. ships.	Tonnage.
Iron and steel English steamers.	638	912,827	517	780,727
Steel English steamers.	103	156,619	64	113,380
Iron and steel English sailing ships.	87	130,660	91	126,395
Shipping for foreign countries.	...	129,488	...	211,313
Total.	...	1,329,604	...	1,240,824
Total in 1880.	...	796,221 tons.		
" 1881.	...	1,013,208 "		
" 1882.	...	1,240,824 "		
" 1883.	...	1,329,604 "		

The extraordinarily rapid growth is very striking.

Camels as Motive Power.

It is reported that cars drawn by camels are to be employed upon the railway which Russia is now constructing across the Kara-Koum (Black Sand), or Desert of Khiva, from the eastern coast of the Caspian Sea toward Kizil Arvat and Askabad. This is certainly a novel employment for the "ship of the desert," but on the portion of the completed line which is still untraversed by locomotives the camel will undoubtedly be of considerable service. In several parts of the post trail which crosses the northern end of the Kara-Koum Desert, skirting the Sea of Aral, camels are advantageously substituted for horses. As to the harnessing of the camel to a car, it is quite a common sight in some parts of India. In the streets of Allahabad one may frequently meet large omnibuses with a kind of upper deck in addition to the usual accommodation, and drawn by two camels apiece. Even the post-chaises of Western Bengal are sometimes drawn by camels instead of horses, and, as a rule, these curious steeds are found to work very well.

Japanese Railroads.

Progress is made with the railroad, 36 miles long, which is the first section of the road to extend the whole length of the island of Nippon. The construction of the line will soon be pushed beyond the first section. The country traversed on the first 36 miles is very rich and fertile; the stations (all of which have been made as economically as possible) and the rolling stock, except the engines, have been made in Japan. The existing railroads in Japan are four, aggregating 155 miles. There is also in course of construction a road 81 miles long. Three of these lines belong to the Japanese Government, the rest to the Japanese Railway Company.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

- Atlantic & Pacific*, annual meeting, at the office in Boston, May 15, at noon.
- Canadian Pacific*, annual meeting in Montreal, May 14. Transfer books close May 6.
- Central of New Jersey*, annual meeting, at the office in Jersey City, May 9, at noon. Transfer books close April 18.
- Chicago, Milwaukee & St. Paul*, annual meeting, at the office in Milwaukee, Wis., June 5, at noon. Transfer books close May 17.
- Chicago & Northwestern*, annual meeting, at the office in Chicago, at 1 p. m., on June 5. A special meeting is also called for June 26.
- Delaware & Hudson Canal Co.*, annual meeting, at the office in New York, May 13, at noon.
- Lake Shore & Michigan Southern*, annual meeting, at the office in Cleveland, O., May 7.
- Michigan Central*, annual meeting, at the office in Detroit, Mich., May 8.
- New York & Harlem*, annual meeting, at the Grand Central Depot in New York, May 20, at noon.
- St. Louis, Alton & Terre Haute*, annual meeting, at the office in St. Louis, June 2, at 2:30 p. m. Stock transfer books close April 25; registry of voting bondholders May 3.

Dividends.

- Dividends have been declared as follows:
- Boston & Maine*, 4 per cent., semi-annual, payable May 15, to stockholders of record on April 24.
- Manchester & Lawrence*, 5 per cent., semi-annual, payable May 1.
- Nashua & Lowell* (leased to the Boston & Lowell), 3½ per cent., semi-annual, payable May 1. The November dividend was 3 per cent.
- New York, Providence & Boston*, 2 per cent., quarterly, payable May 10. Transfer books close May 1.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

- American Society of Mechanical Engineers*, Spring meeting, in Pittsburgh, Pa., on Tuesday, May 20.
- Railway Car Accountants' Association*, annual convention, in Richmond, Va., on Tuesday, May 20. Western members are requested to meet in Ashland, Ky., May 18. Southern members in Atlanta, Ga., May 17, and Eastern members in Washington, May 19, to proceed to Richmond together.
- Yard-Masters' Mutual Benefit Association*, annual convention, in Atlanta, Ga., on Wednesday, June 11.
- New England Railroad Club*, regular monthly meeting, at the rooms of the club in Boston on Wednesday, May 28.
- Passenger Conductors' Life Insurance Co. of the United States*, annual meeting, at the Girard House in Philadelphia, on Wednesday, May 21.
- American Institute of Mining Engineers*, spring meeting, in Chicago, beginning on Tuesday, May 27.
- American Society of Civil Engineers*, annual convention, in Buffalo, N. Y., beginning on Tuesday, June 10. Full arrangements will soon be announced.
- Master Car-Builders' Association*, annual convention, in Saratoga, N. Y., beginning on Tuesday, June 10.
- Master Mechanics' Association*, annual convention, in Long Branch, N. J., beginning on Tuesday, June 17.
- Railway Telegraph Superintendents' Association*, annual convention, in Boston, on Tuesday, June 17.
- General Baggage Agents' Association*, semi-annual meeting, in Boston, on Wednesday, July 16.
- Master Car-Painters' Association*, annual convention, in Boston, on Wednesday, Sept. 3.
- Road-Masters' Association of America*, annual convention, in Indianapolis, Ind., on Wednesday, Sept. 10.
- Association of American Railroad Superintendents*, semi-annual meeting, in Boston, on Tuesday, Sept. 16.
- General Time Convention*, fall meeting, at the Continental Hotel, Philadelphia, on Thursday, Oct. 9.
- Southern Time Convention*, fall meeting, at No. 46 Bond street, New York, on Wednesday, Oct. 15.
- American Street Railway Association*, annual convention, in New York, on Wednesday, Oct. 15.

Foreclosure Sales.

The *Jamesville & Washington* road was sold in Raleigh, N. C., April 22, under a decree of foreclosure, and bought for \$10,000 by John N. Winans, of New York, trustee for the bondholders. The sale included 39,000 acres of land in Eastern North Carolina which belonged to the company. The road extends from Jamesville, N. C., on the Roanoke River, southward to Washington, 22 miles, and it was built chiefly to aid in the lumber operations of the company. The bonded debt of the company was \$300,000 in first-mortgage bonds, and was entirely owned in England. The railroad has been for some time past operated by the Norfolk Southern Co. under a temporary agreement.

Yard-Masters' Mutual Benefit Association.

The Yard-Masters' Mutual Benefit Association of the United States and Canada will hold its tenth annual convention in Atlanta, Ga., on Wednesday, June 11 next, when officers will be elected and such other business transacted as may come before the convention.

The address of the Grand Secretary, Mr. Joseph Sanger, is No. 113 South Jersey street, Indianapolis, Indiana.

Baltimore & Ohio Employees' Relief Association.

The March sheet of this Association shows payment of 934 benefits during the month, as follows: Main Stem, Transportation Department, 132; Machinery Department, 256; Road Department, 118; Trans-Ohio Divisions, 204; Pittsburgh Division, 101; physicians' bills, 93; total, 934.

By the direction of the President *pro tem.* of the Baltimore & Ohio Railroad Co., Dr. Richard McSherry is appointed Medical Examiner of the Relief Association, and assigned to duty on Chicago Division, vice Dr. J. A. Robb transferred. The headquarters of this Examiner will be, after March 31, at Garrett, Ind., instead of Tiffin, O., as heretofore.

Trunk Line Passenger Agents' Meeting.

A meeting of the general passenger agents of the Trunk lines was held in New York, April 29, to consider the condition of emigrant rates. The report that the Pennsylvania Railway had countenanced the high commission allowed by some lines on this business was denied by a representative of that company, and other lines also stated that they had not consented to the commissions paid by the White Star and the Inman lines. The question whether the railroads should interfere to stop cutting on this business by refusing to honor the orders of the steamship companies allowing the large commissions was discussed, but no action was taken.

Joint Executive Committee.

The meeting of the Joint Executive Committee, Passenger Department, in New York, continued until April 25.

The new interior pools between Columbus, Dayton, Cleveland and the seaboard were completed, and settlements were ordered to take place under them. A general reduction of rates was ordered on the Pittsburgh & Lake Erie road between competitive points, and the present differentials of the Indiana, Bloomington & Western road were continued till June 1.

On the last day a resolution was passed extending the present contract for 30 days, which will bring it up to June 1, and in the meantime all rates to and from points within the territory of the Joint Executive Committee were ordered to be restored at once to tariff rates.

The Committee then adjourned until May 7. At the adjourned meeting a new contract will be prepared, to take effect from June 1. It is expected that the Grand Trunk, the Lackawanna and the West Shore roads will be represented at the adjourned meeting and will take part in the contract.

Northwestern Traffic Association.

The conference between the representatives of the roads in the Northwestern Traffic Association and the Chicago, Burlington & Quincy began in Chicago, April 23, and continued for several days. At one time it was thought that no agreement whatever could be reached, both parties refusing to consider the propositions leading to a compromise. Another source of irritation was a charge that the roads in the Association had been making special rates to points to which it had been agreed that rates should be maintained pending the decision of the matters in dispute.

More peaceable counsels prevailed, however, and some progress was made toward a settlement. The question of arranging divisions of business from competing points in Nebraska was referred to a committee whose report, however, was not final. Later, the General Freight Agent of the Burlington road was appointed to act in connection with Commissioner Vining of the Northwestern Traffic Association in arranging the plan of adjustment, and finally an agreement was reached for a temporary division and maintenance of rates, all contracts and cuts of rates to be withdrawn. Another meeting was to be held this week, when a plan of adjustment will probably be adopted and its details will be finally arranged.

Trunk Line Presidents' Meeting.

A meeting of the Presidents of the Trunk Lines was held in Commissioner Fink's office in New York, April 29, at which the lines were represented as follows: New York Central, President J. H. Rutter and Third Vice-President H. J. Hayden; Erie, President H. J. Jewett, First Vice-President George R. Blanchard, and General Traffic Manager R. C. Vilas; Pennsylvania, President George B. Roberts and First Vice-President Frank Thomson; Baltimore & Ohio, General Freight Agent Frank Harriott.

The principal subject for discussion was the application of the Baltimore & Ohio, made under the agreement, for a reduction in the east-bound rates on grain from Chicago to New York. After some discussion, it was agreed to make no reduction, but to maintain the rate at 15 cents. It was decided that hereafter, when a reduction is asked for under the agreement, the Commissioner must be supplied with all the facts and evidence to support the charges of cutting. He will then notify the accused road or roads, which will be allowed to make an advance, and will refer the subject to the Trunk Lines Executive Committee. This committee shall decide whether the reduction shall be made; but if no agreement can be reached, the Commissioner can then, acting as arbitrator, make a final decision.

There was some discussion of the question whether it would not be well to make reductions only from the points where cuts were made, but it was decided that it would be impracticable to make local reductions of this kind without a general change in rates.

Engineers' Club of Philadelphia.

A special business meeting was held in Philadelphia, April 19, President Wm. Ludlow in the chair; 36 members and 5 visitors present.

The following gentlemen were elected active members of the club: W. Hunter, H. K. Nichols, Stewart L. Neff, Lloyd Bankson, Wm. B. Reilly, James R. Schick, Jesse Garrett, Theo. H. Liders, J. Chester Wilson, W. S. Shearer, S. B. Whiting, Frederick V. Matton, John W. Nate, Paul C. Brewer, H. W. Loss, Jones Wister, George W. Bramwell, John S. Naylor and Samuel R. Marshall.

Mr. S. N. Stewart, visitor, described a "Cushioned Pier and Rolling Trunnion Draw-Bridge." With a working model he showed that a 6-lb. draw could be turned by a pennyweight pressure or a breath, and claimed that, with a leverage six times as great as that of the model, 20 lbs. pressure would turn a 100-ton draw. He also claims that a pivot bridge, swinging in a horizontal plane, is a trap into which men, teams and railroad trains fall every year, while a Bascule-draw, rising in the air, closes the approach and serves as a signal and warning. Referring to his project for a bridge across the Delaware, he said: "Hitherto the restrictions imposed by the authorities have been practically prohibitive, but the land interests are as much to be considered as those of navigation, for rivers were not made for mariners alone; and the land interests are fully greater than the interests of those who go down to the sea in ships. A compromise should be effected, for a bridge has already become a pressing need and will soon be a positive demand." Mr. Stewart claimed that a bridge only 20 ft. wide would accommodate two continuous streams of vehicles and still leave a wide footway.

Mr. Wm. P. Osler presented, for Mr. J. Godolphin Osborne, an account of the "Pocahontas Mine Disaster," and the subsequent steps taken for the recovery of the bodies and the resumption of mining. He submitted the March number of the *Virginian*, as containing an accurate detailed description of the mine and plan of the workings, from data by Mr. W. A. Lathrop, Superintendent. He then showed how probable it was that gas would have been detected by the engineers, had it existed; explained Mr. Lathrop's theory, afterward verified, of the location of the fire, the method of damming and flooding the mine with 17,500,000 gallons of water to extinguish it—the latter being accomplished in 16 days, one day being lost in repair of a dam, and the recovery and identification of the bodies. He states that the mine itself is but little damaged, that the cause of the explosion is, as yet, unknown, and, in conclusion, refers to the ridiculous and imaginary statements that have been published.

Mr. E. S. Hutchinson supplemented the above by an account of his recent visit to the mine, confirming, as far as he had observed, Mr. Osborne's opinion of damage to the mine; timbers were displaced, cars demolished, etc., but there was no fall of roof except in the fan-entry, where much slate had fallen, but where a week's work would repair damage. He attributes the safety of the roof to the fact that from 12 in. to 18 in. of coal had been left as an elastic support to the treacherous slate above. He considers the presence of 5 or 6 in. of fine, dry coal dust on the floor a phenomenon of special interest; and, while withholding a positive opinion in view of pending investigations by a committee of the Institute of Mining Engineers, he refers to a number of authorities to show the important bearing dust explosions have upon safety in mines like this, apparently entirely free from fire damp.

Mr. J. Foster Crowell announced that the new bridge of the Pennsylvania Schuylkill Valley road over the Schuylkill River at Manyunk had just been completed, and noted, as a remarkable illustration of the vast strides made in American bridge construction during the past few years, that so large and important a structure as this is, being one-third of a mile in length and 90 ft. high, can be reared and come into use without exciting special interest or even deserving particular mention from an engineering point of view. There were, however, certain structural features, arising out of some peculiarities of location, which might prove instructive, and these were briefly described and illustrated by blackboard sketches.

The Secretary read, from Mr. J. H. Murphy, a discussion of the "Switch Formula" by Mr. John Marston, recently published, which was extended to a discussion of curve location by Messrs. J. F. Crowell, A. R. Roberts and the Secretary.

Mr. A. R. Roberts described a contrivance he had designed, by which a three-throw point switch can be operated from a single stand.

The Secretary read, for Prof. L. M. Haupt, a letter from Prof. Louis H. Barnard, urging an interest on the part of the club in the election of trustees of the State College, and it was referred to the Secretary, with instructions to confer with Prof. Haupt and report at next meeting.

The Secretary explained that the "Reference Book" sheets were all published in the *proceedings*, and, in that form, were open to purchase by any non-member desiring them; but he considered that their separate publication in note book form should be exclusively for the benefit of club members, and offered a motion to that effect, which was carried.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—At the annual meeting in Topeka, Kan., April 24, the following directors were chosen: C. K. Holliday, Topeka, Kan.; L. S. Every, Emporia, Kan.; B. F. Stringfellow, Atchison, Kan.; S. A. Kent, Chicago; J. T. Burr, B. P. Cheney, A. W. Nickerson, L. Nickerson, C. J. Paine, Alden Speare, G. O. Shattuck,

W. B. Strong, A. E. Touzalin, Boston. The only new director is Mr. Shattuck, who succeeds C. W. Pierce. The board re-elected W. B. Strong President; A. E. Touzalin, Vice-President; B. P. Cheney, Chairman of the board; E. Wilder, Secretary and Treasurer; George W. McCrary, General Counsel; A. A. Robinson, General Manager.

Atchison, Topeka & Santa Fe Leased Lines.—In Santa Fe, N. M., April 21, officers were chosen as below for the companies named, whose roads are leased to the Atchison, Topeka & Santa Fe Co.: *New Mexico & Southern Pacific.*—W. B. Strong, President; E. A. Touzalin, Vice-President; A. A. Robinson, General Manager; E. Wilder, Secretary and Treasurer; W. W. Griffin, Assistant Secretary. *New Mexican.*—The same officers. *Rio Grande, Mexico & Pacific.*—The same officers.

Baltimore & Ohio.—It is reported that Mr. M. Voorhees, now Superintendent of the Southern Car Works in Knoxville, Tenn., will succeed Mr. L. Packard as Master Car-Builder of this road.

Beach Creek, Clearfield & Southwestern.—Mr. John B. McIntyre has been appointed Engineer in Charge of Construction, with headquarters at Jersey Shore, Pa. He was recently on the West Shore road.

Brunswick & Western.—Mr. Richard J. Evans has been appointed Superintendent and Assistant Chief Engineer to this road, to date from April 16.

Canadian Pacific.—Mr. Robert Kerr has been appointed Assistant Traffic Manager in place of Mr. Harder, resigned. Mr. Kerr is now on the Northern & Northwestern road.

Chesapeake & Ohio.—The Richmond (Va.) State, of April 29, says: "On May 1 Mr. Robert H. Fisher, who has been filling the responsible position of Auditor of the Chesapeake & Ohio Railroad for a number of years, will be succeeded by Mr. Charles Bronson, late Secretary and Treasurer of the Kentucky Central Railroad. Mr. Fisher has been appointed local ticket agent of the Chesapeake & Ohio, and will succeed Mr. Charles Lorraine, who has been appointed General Baggage Agent."

Chesapeake, Ohio & Southwestern.—Mr. D. W. C. Brown, having resigned the General Superintendency of this company, to take effect May 1, all communications pertaining to the general management of this road should be addressed from and after that date to Gen. John Echols, Vice-President. Heads of all departments will report and be governed accordingly.

Mr. C. F. Krebs is appointed Assistant to the Vice-President, taking effect May 1.

Chicago, Burlington & Quincy.—At the annual meeting in Chicago, April 30, the old directors were re-elected without change.

Chicago, Milwaukee & St. Paul.—Mr. F. A. Miller has been appointed General Agent of the Passenger Department in Chicago.

Chicago & West Michigan.—At the annual meeting recently the following directors were chosen: Charles Francis Adams, Jr., James H. Blake, Alpheus Hardy, H. H. Hunnewell, Charles Merriam, George O. Shattuck, Charles S. Sargeant, C. P. R. Thayer, Nathaniel Thayer, all of Boston.

Cleveland, Mt. Vernon & Delaware.—The following circular from the office of the General Superintendent is dated Akron, O., April 26:

"The offices of the Freight and Passenger departments of this road will be moved from Columbus, O., to Akron, O., on May 1, proximo. On and after that date all communications relating to the business of these departments should be addressed to N. Monsarrat, General Superintendent, vice Mr. E. T. Affleck, General Freight and Passenger Agent, resigned."

Denver, Little Butte & Canon City.—The officers of this new company are: President, D. P. Eels; Vice-President, George W. Short; Secretary and Treasurer, H. F. Claßen; Chief Engineer, F. F. Barr.

Denver & Rio Grande.—The new board has elected Frederick Lovejoy, President; Adolph Engler, Vice-President; D. H. Moffatt, second Vice-President; Wm. Wagner, Secretary and Treasurer. The only change is the election of Mr. Moffatt, of Denver, as second Vice-President.

Deerfield River Co.—The office of this company is at Holyoke, Mass.; its officers are as follows: D. H. Newton, President; Moses Newton, Vice-President; John C. Newton, Treasurer. Mr. George H. Hutchinson is Engineer of the railroad which the company is building.

East Side & Mt. Vernon.—At a meeting held in Mt. Vernon, N. Y., April 29, the following were elected directors: J. R. Croes, J. M. Masterton, Joseph S. Wood, David Quackenbush, David Cromwell, James Russell, Philip Lucas, Jr., James Henderson, Jr., John Berry.

Fort Worth & Denver.—Mr. C. D. Sayles has been appointed Chief Train Dispatcher, with office in Fort Worth, Texas.

Helena & North Arkansas.—The directors of this new company are Samuel J. Clark, Henry N. Pharr, William F. Gill, J. F. Wendland and G. D. Joyner. Office at Helena, Arkansas.

Hannibal & St. Joseph.—Mr. A. C. Dawes has been appointed General Passenger Agent, and Mr. E. J. Swords General Freight Agent. These gentlemen hold the same positions on the Kansas City, St. Joseph & Council Bluffs road.

Honduras.—The directors of this company are: J. F. Crosby, Richard B. Hubbard, of Texas; Richard W. Bogart, G. Hilton Scribner, Charles D. Wyman, Yonkers, N. Y.; Silas B. Dutcher, Wm. M. Safford, Brooklyn, N. Y.; John N. Haywood, J. J. Mahoney, Abraham W. Platt, John Q. Preble, Wm. H. Warner, New York. The officers elected are: President, G. Hilton Scribner; Vice-President, Wm. H. Warner; Secretary, A. W. Platt; Treasurer, John N. Haywood; Executive Committee, Silas B. Dutcher, R. W. Bogart, A. W. Platt.

Lackawanna Line.—Mr. R. F. Harriott has been appointed Agent of this line in Chicago.

Little Rock & Fort Smith.—At the annual meeting in Little Rock, Ark., April 24, the old board was re-elected as follows: W. M. Fishback, Fort Smith, Ark.; Jesse Turner, Van Buren, Ark.; S. F. Clark, D. E. Jones, W. D. Slack, Little Rock, Ark.; Elisha Atkins, J. H. Converse, F. G. Dexter, F. M. Weld, Boston. The board re-elected J. H. Converse, President; Henry Wood, General Manager; Joseph Kampman, Treasurer.

Little Rock, Mississippi River & Texas.—At the annual meeting in Little Rock, Ark., April 24, the old board was re-elected, as follows: V. D. Wilkins, Pine Bluff, Ark.; D. E. Jones, L. F. Pindall, C. F. Penzel, J. T. W. Tillar, Little Rock, Ark.; J. E. Redfield, Essex, Conn.; E. H. Winchester, Portsmouth, N. H.; Elisha Atkins, F. G. Dexter,

Boston. The board re-elected Elisha Atkins President; Henry Wood, General Manager; Joseph Kampman, Treasurer.

Louisville, Evansville & St. Louis.—Mr. W. A. Van Frank has been appointed Chief Engineer in place of Mr. W. F. Sherman, who has gone to the Gulf, Colorado & Santa Fe. Mr. Van Frank was formerly on the New York & New England road.

Mr. J. F. Odiorne, Cashier, has been appointed Paymaster also.

Memphis & Little Rock.—The following official circular has been issued by Rudolph Fink, Receiver:

"By an order from the United States Circuit Court for the Eastern District of Arkansas, in the cause of R. K. Dow and others vs. the Memphis & Little Rock Railroad Co. (as reorganized), I have been appointed Receiver, and as such have been placed in possession of all the property of said railroad company."

"I have also assumed the duties of General Manager and Purchasing Agent, Mr. E. K. Sibley retiring."

"Until further orders all other agents, officers and employees heretofore in the service of said railroad company will be continued in their respective places at the same compensation formerly paid them by said railroad company."

"Station agents, and all other accounting officers, will render accounts at the time and in the form heretofore used, and such accounts to be addressed to C. H. Dolbeer, Auditor for Rudolph Fink, Receiver, and will remit or pay all moneys to John W. Goodwin, Treasurer for the Receiver."

"Officers and agents will, as soon as practicable, make an inventory of all the company's property in their charge, and send a full statement to the Receiver."

"Officers and agents will, within five days from date, acknowledge the receipt of this order in writing to the Receiver, stating whether or not they will act under him, and obey his orders and those of said Court."

Michigan Central.—Mr. J. D. Hawks has been appointed Chief Engineer in place of Edward H. Phelps, deceased. Mr. Hawks has been for some time on the New York, West Shore & Buffalo road, and was formerly Division Engineer on the Lake Shore road.

Middle States Lumber Association.—Mr. E. T. Affleck is appointed Commissioner of the Middle States Lumber Association, vice D. T. Disney, resigned, taking effect May 1, 1884. Mr. Affleck was recently General Freight and Passenger Agent of the Cleveland, Mt. Vernon & Delaware road.

Minneapolis, Mille Lacs & Northern.—The directors of this new company are: H. B. Cowles, Charles H. Rines, Princeton, Minn.; Horace Henry, Henry Hills, Thomas Lowery, R. P. Russell, E. M. Wilson, Minneapolis, Minn.; M. C. Tuttle, St. Paul, Minn.; George F. Brett, Washington.

Missouri Pacific.—A St. Louis dispatch of April 29 announces the appointment of Samuel Phillips as Assistant General Freight Agent, to fill the vacancy occasioned by the resignation of J. J. Rogers. Mr. Phillips has been chief clerk of Col. Hoxie, Third Vice-President of the road, for several years. He will have jurisdiction of all lines north of Texarkana and Denison, and will assume the duties of the position on May 1.

Mr. J. E. Wallace has been appointed Superintendent of Bridges, Buildings and Water Service of the Texas & Pacific Division.

Moos Point, Scranton & East Pascagoula.—The officers of this new company are: President, S. S. Henry; Vice-President, L. V. Dantzier; Secretary, C. M. Liddle; Treasurer, J. W. Griffin.

Old Colony.—The following circular from General Manager J. R. Kendrick is dated Boston, April 26:

"On and after May 1 next, Mr. J. N. Lauder, in addition to his other duties, will have charge of the cars and car shops of this company, and may be addressed as Superintendent of Rolling Stock, office at Boston."

"Mr. Samuel Stevens will, after that date, have charge of the buildings, station-houses, and bridges of the road, and may be addressed as Supervisor of Bridges and Buildings, either at Boston or Taunton."

Ohio Southern.—At the annual meeting in Springfield, O., April 23, the following directors were chosen: H. L. Chapman, Jackson, O.; Allen Hegler, Washington Court House, O.; H. L. Willard, Wellston, O.; Amos Whiteley, W. N. Whiteley, Troy, O.; R. K. Dow, Claremont, N. H.; Dumont Clark, Austin Corbin, Henry Graves, J. R. Maxwell, Alfred Sully, New York. The road is controlled by the Indiana, Bloomington & Western.

Red Line.—Mr. J. L. Clark has been appointed Agent of this line in Chicago.

Richmond & Danville.—Mr. Charles P. Hammond has been appointed General Road-master of the Atlanta & Charlotte Division. He was recently on the Mobile & Ohio.

Rochester & Pittsburgh.—Mr. J. P. Hovey is appointed Superintendent of Motive Power and Machinery of this company, appointment to take effect May 1. His title has been Master Mechanic heretofore.

Staten Island Rapid Transit Co.—This company elected the following named directors April 29: Frederick White, J. Frank Emmons, A. Hegewisch, H. L. Horton, E. Norton, A. B. Boardman, W. H. Pendleton, William Krebs, T. E. Leeds, J. K. Martin, J. Gowan, H. Holton Wood, William Kentgen.

Texas & St. Louis.—This company has re-elected the old officers, as follows: J. W. Paramore, President; Wm. Senter, Vice-President; Charles T. Bonner, Secretary; L. B. Fish, Treasurer.

Valley of Ohio.—At the annual meeting recently the following directors (one third of the board) were chosen: L. V. Bockins, Henry M. Flagler, Henry B. Payne. The board re-elected J. H. Wade President; D. L. King, Vice-President; W. B. Porter, Secretary and Treasurer.

Zanesville, McConnellsville & Pomeroy.—The following circular is dated Zanesville, O., April 24:

"Robert M. Hughes has been appointed Assistant to the President of this company, and will act in accordance with the duties of the Chief Executive's (the President) office, as assigned by that official. He will have authority to use the President's name in minor matters, and represent him in his absence."

"His appointment went into effect April 1. His headquarters will be at Zanesville, Ohio."

PERSONAL.

—Mr. Wm. Harder has resigned his position as Assistant Traffic Manager of the Canadian Pacific road.

—Mr. H. G. Allis has resigned his position as General Auditor of the Little Rock & Fort Smith and the Little Rock, Mississippi River & Texas companies.

—The report that Mr. F. C. Nims had resigned his position as General Passenger Agent of the Denver & Rio Grande road is contradicted. It is stated that Mr. Nims has no intention of leaving the road.

—Mr. Henry E. Sprague has resigned his position as a director of the Denver & Rio Grande Co. in order to give his entire time to the performance of his duties as President of the Colorado Coal & Iron Co.

—Mr. J. H. De Huff, formerly of Lebanon, Pa., but for several years past connected with the engineering department of the Burlington & Missouri River road, died very suddenly in Aurora, Neb., April 25.

—Mr. Wm. R. Leflet desires it stated that he has no intention of disposing of his interest in the *Railroad*, as reported in certain quarters. He has become sole proprietor of that journal, and will continue to publish it at Toledo.

—Mr. Joseph F. Tucker has resigned his position as Traffic Manager of the Illinois Central road. Mr. Tucker offered his resignation some months ago, but afterwards consented to withdraw it. He has been connected with the road in various capacities for 28 years.

—Mr. D. W. C. Brown, for some time past General Superintendent of the Chesapeake, Ohio & Southwestern road, has resigned his position on account of ill health. Mr. Brown has had charge of the road for several years, and was formerly on the Cincinnati, Sandusky & Cleveland road.

—Mr. H. A. Alden, late Superintendent of the South-eastern Railway, being about to leave Farnham, Que., to take up his residence in Illinois, the employees of the road and citizens of the town on April 23 presented him with a very flattering testimonial of their esteem in a farewell address.

—Mr. James R. Keene, who has been well known throughout the country, has ended his long career as a bold and daring speculator by a total and disastrous failure. Mr. Keene's connection with railroads has been chiefly confined to dealing in their stocks, but he was for several years a director of the Central Railroad Co. of New Jersey and in several other companies.

—George B. Lake, Assistant Chief Engineer of the Atchison, Topeka & Santa Fe Railroad, died at Topeka, Kan., on April 27, after a short illness. Mr. Lake graduated from the engineering department of Michigan University in 1869, and most of his service since then has been in various positions on the Atchison, Topeka & Santa Fe road. He was a remarkably studious and capable engineer, a modest, loyal and thoroughly lovable man.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

Three months ending March 31:					
	1884.	1883.	Inc. or Dec.	P. c.	
N. Y., Sus. & W.	\$199,899	\$211,778	D.	\$11,879	5.6
Norfolk & West.	648,675	609,168	I.	39,506	6.0
Net earnings.	247,595	256,868	D.	9,273	4.0
Northern Cent.	1,271,023	1,492,982	D.	221,959	14.8
Net earnings.	438,601	492,440	D.	53,839	10.9
Ohio & Miss.	894,950	1,025,067	D.	130,117	14.5
Pennsylvania.	11,093,594	11,830,553	D.	736,959	6.6
Net earnings.	1,695,065	4,262,978	D.	5,071,913	13.3
Phila. & Reading.	4,192,869	4,731,877	D.	539,008	11.4
Central lines.	2,193,413	.....	.....	.....	.....
South Carolina.	373,595	415,974	D.	42,379	10.2
Month of March:					
N. Y., Sus. & W.	\$71,704	\$76,974	D.	\$5,270	7.0
Norfolk & West.	210,298	217,344	D.	7,046	3.0
Net earnings.	70,215	103,985	D.	33,770	27.0
Northern Cent.	492,564	500,865	D.	8,301	1.8
Net earnings.	182,133	204,508	D.	22,375	10.9
Ohio & Miss.	420,648	391,617	I.	29,031	7.3
Pennsylvania.	4,002,627	4,189,380	D.	186,753	4.5
Net earnings.	1,401,541	1,435,417	D.	50,876	3.5
Phila. & Reading.	1,456,180	1,609,240	D.	212,060	12.7
Net earnings.	518,337	690,743	D.	172,406	25.0
Central lines.	74,964	.....	.....	.....	.....
Net earnings.	190,738	.....	.....	.....	.....
Rome, W. & Og.	133,162	120,623	I.	12,539	10.4
Net earnings.	47,141	42	.....	.....	.....
South Carolina.	110,695	136,783	D.	26,088	19.0
Third week in April:					
Bur. C. R. & No.	\$48,458	\$52,668	D.	\$4,210	7.9
Canadian Pac.	74,000	83,000	D.	9,000	20.4
Ches. & Ohio.	69,915	64,708	I.	5,207	8.0
Chi. & Alton.	16,508	161,896	I.	2,072	1.3
Chi. & East Ill.	30,001	34,600	D.	4,599	11.9
Chi. Mil. & St. P.	434,000	458,147	D.	24,147	5.3
Chi. & Nor'west.	391,600	394,500	D.	2,900	0.7
Chi. St. Paul, M. & Omaha.	128,400	96,600	I.	31,800	32.9
Eliz., Lex. & B. S.	14,263	13,448	I.	815	6.0
Long Island.	47,117	43,180	I.	3,930	9.1
Louisv. & Nash.	248,040	214,709	I.	33,371	15.5
Mil., L. S. & W.	21,525	19,555	I.	1,960	10.2
Mil. & Northern.	9,600	9,745	I.	145	1.2
No. Pacific.	344,100	146,700	I.	197,400	134.3
Roch. & Pitts.	21,201	7,328	I.	13,873	189.3
St. L. & San F.	79,900	66,500	I.	13,400	20.0

* Deficit.

Weekly earnings are usually estimated in part, and are subject to correction by later statements.

Grain Movement.

For the week ending April 19 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the eight Atlantic ports have been, in bushels, for the past seven years:

Year.	Northwestern receipts.		Northwestern shipments.		Atlantic receipts.
	Total.	By rail.	Total.	By rail.	
1877....	3,002,569	3,082,417	1,363,574	35.4	2,858,970
1878....	3,488,560	3,034,035	997,549	29.8	3,097,286
1879....	3,436,327	3,017,955	3,017,955	100.0	4,532,797
1880....	2,912,130	3,984,877	1,181,994	29.7	4,336,804
1881....	3,629,586	4,350,919	3,543,249	81.5	4,291,224
1882....	3,629,878	3,494,156	1,349,876	33.6	1,678,592
1883....	2,271,279	2,508,294	2,264,484	90.3	1,894,551
1884....	2,632,960	4,522,069	4,260,191	94.2	2,920,157

Thus the receipts of the Northwestern markets for the week were greater this year than last, but smaller than in the corresponding week of any of the six years previous to last year. They were 310,000 bushels less than in the previous week of this year and were the smallest receipts there have been at those markets in any week since July, 1882, except in the corresponding week of last year.

The shipments of these markets, on the other hand, were larger than in the corresponding week of any previous year (though in several of them lake navigation was open), though there were only 27,000 bushels more than in the previous week of this year. In only two or three weeks, if ever, have the rail shipments been as large as before. Of the total shipments 262,478 bushels went down the Mississippi. The Atlantic receipts for the week were larger than in the

corresponding weeks of 1883 and 1882, but smaller than in any of the four years from 1878 to 1881. They were 569,000 bushels more than in the previous week of this year, and were the largest since the first week of December last.

Exports from Atlantic ports for the week ending April 19 have been, for five years:

	1880.	1881.	1882.	1883.	1884.
Flour, bbls.	102,719	157,411	119,058	135,005	110,312
Grain, bu.	4,413,320	3,158,945	886,588	1,504,416	2,067,598

Thus the exports of grain this year were a third more than last as well as twice as great as in 1882, though a third less than in 1881, and not half as great as in 1880. The exports were 142,000 bushels more than in the previous week of this year, and the largest of the year. Nearly two-thirds of the exports were wheat.

Coal.

Coal tonnages for the week ending April 19 are reported as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Anthracite	61,653	757,125	D. 695,472	91.9
Eastern bituminous	170,496	159,690	I. 10,797	6.7
Coke	55,935	69,271	D. 13,336	19.2

During the week work at the mines of the leading anthracite companies, with the exception of the Pennsylvania Railroad Co., was entirely suspended. This policy of a full week's suspension at a time is to be continued until the demand increases and the market is no longer overstocked.

The coal tonnage of the Pennsylvania Railroad for the week ending April 19 was:

	Coal.	Coke.	Total.
Line of road	120,553	40,840	170,393
From other lines	71,945	6,095	77,440
Total	191,898	55,935	247,833

The total tonnage this year to April 19 was 3,823,449 tons, against 3,687,932 tons to the corresponding date last year, an increase of 135,517 tons, or 3.7 per cent.

The output of coal from Alabama mines in March was 114,808 tons. The largest shipments made were by the Pratt Coal & Coke Co., whose mines sent out 50,973 tons.

A dispatch from Pittsburgh, April 25, says: "At a meeting held in Philadelphia yesterday a settlement in the railroad coke pool, in which the Pennsylvania, the Baltimore & Ohio, and the Pittsburgh, McKeesport & Youghiopheny Railroad companies are interested, was effected. The basis of settlement is understood to be the same as that of the old agreement, no change being made in the percentage of any of the roads interested. The agreement is to stand for six months. The percentages are as follows: Pennsylvania, 55; Baltimore & Ohio, 30; Pittsburgh, McKeesport & Youghiopheny, 15."

It is said that the Lehigh Valley Co. is negotiating with Mr. Charles Berwind for the purchase of an extensive tract of bituminous coal land in the Snow Shoe region. The price asked for the lands is said to be \$1,000,000. Should the transfer be made, the coal for these lands would go over the Pennsylvania Railroad to Shamokin and thence over the Lehigh Valley road to tidewater. The shipments are now made entirely over the Pennsylvania road.

Receipts of Illinois coal and coke at St. Louis for the three months ending March 31 were, in tons:

	1884.	1883.	Increase.	P. c.
Coal	492,384	435,298	57,086	13.1
Coke	22,287	14,480	7,807	53.8
Total	514,671	449,778	64,893	14.4

The coal tonnage of the Chesapeake & Ohio Railroad for the three months ending March 31 was as follows:

	1884.	1883.	Decrease.	P. c.
Coal	217,333	222,851	5,518	2.5
Coke	14,550	31,468	16,918	53.7
Total	231,883	254,319	22,436	8.8

The decrease was in canal, block and gas coals, the shipments of New River coal showing a considerable gain.

Cumberland coal shipments for the week ending April 26 were 60,444 tons. The total shipments this year to April 26 have been 693,545 tons.

Petroleum.

The production of the Pennsylvania and New York oil wells for March are given by Stowell's *Petroleum Reporter* as follows, in barrels of 42 gallons:

	1884.	1883.	Inc. or Dec.	P. c.
Production	2,052,262	1,830,674	I. 221,588	12.2
Shipments	1,873,890	1,641,899	I. 231,991	14.1
Stock, March 31	36,220,270	35,881,255	I. 339,015	0.9
Producing wells	21,000	17,250	I. 3,750	21.7

The production for the month is the largest reported since November, 1882. Of the total the Allegheny District in New York furnished 18.9 per cent.; the Bradford District in Pennsylvania 54.4 per cent.; the Warren District 15.4, and the Lower District 11.3 per cent.

The shipments show a large increase over March, 1883, and also over the preceding month of this year, but were still less than the production.

The stock reported is all in the pipe lines. During the month it increased by 178,372 barrels, which is the excess of production over shipments.

During the month there were 256 new wells completed and 23 dry holes, or failures to find oil, are reported. At the close of the month there were 280 new wells reported in process of drilling.

Shipments of oil for the month were as follows:

	Barrels.	Pr. ct. of total.
New York	715,845	38.2
Philadelphia	285,562	15.3
Baltimore	105,308	5.6
Boston	1,855	0.1
Cleveland	332,324	17.7
Pittsburgh	54,174	2.9
Down the Ohio	3,992	0.2
Local points	279,340	14.9
Refined at Creek refineries	95,490	5.1
Total	1,873,890	100.0

Shipments of oil refined at Creek refineries (reduced to its equivalent in crude) were: New York, 11,199; Philadelphia, 751; Baltimore, 2,786; Boston, 38,790; local points, 41,964; total, 95,490 barrels.

The *Reporter* says: "But few features of interest mark the course of the oil market during the month of March, nor indeed have any been noticeable up to the date of the present writing, April 24. During the early part of the month a considerable amount of attention was fixed on the Henry's Mills field, in the Cooper District, where gushers of various grades were reported almost every day. This field, however, has not latterly received as much attention, as the wells have quite conclusively proved themselves to be of poor staying qualities. At various times during the month wells in other portions of the Cooper and Balltown pools caused some stir in the market, notably the Chambers well, in the Wardwell pool, and Clapp No. 3, in the west end of the Cooper tract; this latter well starting off at about 800 barrels, and after slowing up considerably, responding to a shot on March 21 to the tune of 1,000 barrels a day. On March 17 a well on lot 107, Alma,

created considerable excitement by starting off at a tremendous gait. It soon, however, came down to the figures of an ordinary producer. Several important wells were brought in during the month in the Macksburg, Ohio, field, none of which raised the record greatly; The Keeler No. 3, which opened with 40 barrels a day, being the best of the lot."

Cotton.

Cotton movement for the week ending April 25 is reported as follows, in bales:

	1884.	1883.	Inc. or Dec.	P. c.
Receipts	23,912	33,655	D. 9,743	28.7
Shipments	32,078	56,878	D. 24,800	43.5
Stock, April 25	90,794	189,806	D. 99,012	52.1

Seaports:

	1884.	1883.	Inc. or Dec.	P. c.
Receipts	20,923	59,244	D. 38,321	64.9
Exports	33,636	90,833	D. 57,197	62.9
Stock, April 25	572,785	681,098	D. 108,283	15.9

The total original shipments from plantations for the cotton year (from Sept. 1) to April 25 are estimated at 5,497,232 bales, a decrease from last year of 1,100,322 bales, or 16.7 per cent.

Rates on Milk to New York.

The New York Railroad Commission held a meeting in New York last week to consider the rates on milk to that city. A petition was presented from Long Island farmers asking for a reduction in rates from 30 cents to 20 cents per can of 40 quarts. Superintendent Kimball, of the Newburg, Dutchess & Connecticut road, also appeared and represented that there was not at present a fair division of the rate between his road and the New York Central & Hudson River, the latter company, he claimed, taking more than its fair proportion.

East Bound Rates.

The Baltimore & Ohio Co. last week sent to Commissioner Fink a formal request for a general reduction of rates from the present basis of 15 cents on grain from Chicago to New York to 11 cents, giving as a reason that rates were being cut to 11 cents, and that it was entitled to ask for the reduction under the agreement. Commissioner Fink decided not to grant the request at once, but to submit it to a meeting of the Trunk Line Presidents who declined to make the reduction. Their action is noted elsewhere.

Fruit from Arkansas.

Arrangements have been made with the Missouri Pacific Co. for a fast freight line to run from Little Rock and other points in Arkansas for the purpose of carrying strawberries and other fruit to St. Louis. It is intended to run a regular train five or six days in the week, and connections will probably be made through to Kansas City, Louisville, Cincinnati and Chicago. This is entirely a new trade.

Discrimination in Illinois.

The Illinois Railroad Commissioners have decided not to prosecute the Illinois Central Co. for the penalties incurred by its alleged discrimination against the Kankakee Coal Co. for the reason that the penalties were only intended to aid the Commissioners in the execution of the law, and the railroad company had, without unnecessary delay, adopted the views of the Commission and had since complied with the law, as far as they were able to ascertain. The Commissioners also admitted that the company had been sustained in the rates which it gave by the decisions of previous Commissioners, and also of the Attorney-General. The present Commission refuse to grant a lower rate to competitive points than is given to intermediate points on the same road.

OLD AND NEW ROADS.

Beech Creek, Clearfield & Southwestern.—Track on this road is reported laid from the starting point on the Pine Creek road at Jersey Shore, Pa., westward through the West Branch Valley to Lock Haven, thence following the Bald Eagle Valley to the mouth of Beech Creek, and up that stream to Peale in Clearfield County, a distance of 52 miles in all. At Peale the Clearfield Bituminous Coal Co. has opened some of its mines, and it will at once begin to ship coal from that point. Work is in progress on the line from Peale to Phillipsburg, and also on the extension to the property of the Clearfield Coal Co., beyond Clearfield. This line is built chiefly to give the Clearfield coal district a connection with the leading road.

Boston & Maine.—This company is at work on the extension of the second track, and by July 1 next 10 miles more between Pine Point, Me., and Biddeford will be completed. There will then be 20 miles of double track at the east end and 50 miles at the Boston end of the road.

Boston & Providence.—The third track on this road, between Boston and Readville, was put into operation Monday, and a number of additional trains for suburban travel were run for the first time. On the West Roxbury Branch a 72-pound steel rail is being laid, and it is rumored that other new trains are contemplated between Boston and Dedham.

Boston, Revere Beach & Lynn.—On June 1 this company will replace the season tickets between Boston and towns on the beach with 100-ride tickets, similar to those in use on the Boston & Albany. These tickets will be transferable, and will be sold at about the same rate as the season tickets previously used. If the change proves popular the system of 100-ride tickets will be extended to Lynn and all points on the road.

Burlington, Cedar Rapids & Northern.—The extension of this road northwest into Dakota will start from the present line at Lake Park, Ia., and run through Sibley, Ia., and Luverne, Minn., northward to Pipestone, 75 miles. The line from Lake Park to Pipestone is already under contract. Contracts will shortly be let for an additional 75 miles from Pipestone northwest to Watertown, Dak. Surveys will be made shortly from Watertown to Bismarck.

Canadian Pacific.—Copies of the annual statement respecting the Canadian Pacific Railway, made by Sir Charles Tupper, the Canadian Minister of Railways, have been received. The position of the company is briefly stated as follows:

"Liabilities—\$7,500,000 received from the government, bearing 5 per cent. interest, payable 1891; \$1,381,000 5 per cent. land grant bonds unredeemed; \$7,380,000 payable in 1888 to the Canadian Government; \$55,000,000 of common stock sold and distributed, netting the company \$25,236,828; \$5,000,000 borrowed for one year on \$10,000,000 additional stock as collateral. Total stock outstanding, \$65,000,000.

"Assets—Property on which the company has actually expended, as per report, March 3, 1884, \$58,695,377; subsidy in the form of completed railway, as per official memorandum, 1883 (713 miles), 21,247,000 acres of land yet unsold; Dominion of Canada, guarantee of 3 per cent. interest per annum on stock outstanding for 10 years from November, 1883."

To complete the Canadian Pacific Railway from ocean to ocean 780 miles remain to be built. To accomplish this the Canadian Government has bound itself to pay \$27,710,000, as follows: In subsidy, \$12,710,000; by loan at 5 per cent \$15,000,000.

Charleston & Pittsburgh.—This company has filed articles of incorporation to build a railroad from Charleston, W. Va., to Braxton Court House, by the most practicable route. The distance is about 60 miles, and the line will probably follow the course of the Elk River. The incorporators are principally Pennsylvania parties, Messrs. Wayne McVeagh, of Philadelphia, and Henry McCormick, of Harrisburg, being the most prominent. The office of the company will be at Charleston.

Chicago & Alton.—Notice of the consolidation of the Chicago & Alton and the St. Louis, Jacksonville & Chicago railroads was sent to the Stock Exchange April 24. The notice, which was posted in the Exchange, stated that on April 14 an agreement was made between the two lines named by which the capital stock of the Chicago & Alton shall be increased as follows: Preferred stock, not to exceed 10,541 shares additional; common stock, not to exceed 16,746 shares additional. This new stock will be exchanged for an equal number of the shares of the St. Louis, Jacksonville & Chicago. This union of the two roads has been under consideration for more than a year, and the plan has already received the assent of the required majority of stockholders. The Stock Exchange is asked to list the new stock.

Chicago & Northwestern.—Notice is given that a special meeting will be held June 26 next, when stockholders will be asked to vote on the agreement with the so-called Blair roads. A circular issued by the company says: "It is well known to most of the holders of the stocks and bonds of this company that a portion of its roads in the state of Iowa, including the main line between the Mississippi and Missouri rivers, is operated under perpetual lease, the annual rental paid therefor being a percentage of gross earnings, and varying from year to year with the amount of business. These lines consist of the Chicago, Iowa & Nebraska Railroad, the Cedar Rapids & Missouri River Railroad and the Maple River Railroad, whose aggregate length is 487.97 miles, 27 miles of the latter road having been completed last year. The total rental for the year ending Dec. 31 last amounted to \$1,558,753, and would have been greater had all the Maple River road been in operation.

"An arrangement has been made, based upon actual results of operating, by which, it is believed, the mutual interests of this company and the lessors of these roads will be promoted for the transfer of the ownership of the leased roads to the Chicago & Northwestern Railway Co.

"The agreement provides that this company shall assume the bonded indebtedness of the leased roads, amounting to \$4,915,100, and shall purchase their capital stocks, paying therefor in the common stock of the Chicago & Northwestern Railway Co., amounting to 147,575 shares, the annual charge upon the bonds and stock so assumed and issued (the stock at 7 per cent.) would amount to \$1,389,082, or \$169,671 less than the rental paid last year. This saving is in addition to the annual concession which has been granted for several years past on the rental of the Chicago, Iowa & Nebraska line. The possibilities of the removal of this concession and the enforcement of the full amount of annual rental earned under the lease, are in the power of the lessors; but such action would become so onerous to this company as to lead to serious difficulties between it and the lessors. This cause of apprehension will be removed by the proposed purchase, and the way will be clear for this company to receive the full benefit of having the large expenditures and improvements made on leased roads, which, under grave contingencies of default, might be subject to forfeiture or abandonment, secured to its own roads.

"A positive additional advantage will accrue to this company by arresting the future increase of rental coming from the already large and constantly increasing business fed into the leased lines from roads constructed by this company in Iowa; and a further benefit will ultimately ensue, at the maturity of the existing bonded debts of the leased roads now bearing 7 per cent. interest, by funding them at a lower rate of interest.

"These leased roads and their principal owners also control tributary roads in Iowa and Nebraska, consisting of the Sioux City & Pacific, the Fremont, Elkhorn & Missouri Valley, and the Missouri Valley & Blair Railway & Bridge Co. at the crossing of the Missouri River, in all 418.42 additional miles of road, now in operation; and the agreement of purchase of the leased roads covers also the acquisition of these tributary lines by the purchase and transfer of all or nearly all of their capital stocks, payment therefor to be made by the issue of \$1,968,000 of 5 per cent. 25-year debenture bonds of this company, to be taken at par by the stockholders of the Fremont, Elkhorn & Missouri Valley Railroad Co.

"The total amount of railroad, leased and tributary, thus acquired will be 906.89 miles, and the aggregate cost will be represented by

Bonds and obligations assumed	\$11,149,600
Chicago & Northwestern Railway Co. 5 per cent. debentures	1,968,000
Chicago & Northwestern Railway Co. common stock	14,757,500

Total \$27,875,100

"This is at the average rate of \$30,753 per mile."

Chicago, Parkersburg & Norfolk.—This company has filed articles of incorporation in West Virginia to build a railroad from the Ohio River at a point nearly opposite Harmar, O., southwest to the Virginia line. It is intended as a part of a projected line from Zanesville, O., to Norfolk.

Columbus & Rome.—Work has been begun on the grading of the extension of this road from Chipley, Ga., northeast to Greenville, a distance of about 15 miles.

Connotton Valley.—The committees representing the stock and bondholders of this company have at length agreed upon a plan for the reorganization of the company and recommend the same for adoption. It provides that the legal proceedings now pending in Ohio shall be prosecuted to their final conclusions with as little delay as possible; that at the sale under these proceedings certain trustees to be named in the agreement to be adopted by the security holders shall bid for the property, and, if they become purchasers thereof, shall take title to the same for the purposes and on the trusts of said agreement; that after the purchase has been accomplished a meeting of the parties to the agreement shall be called for the purpose of reorganization and that the capital stock of the new company shall consist of not more than 80,000 shares of preferred stock and not more than 40,000 shares of common stock. The preferred stock is to be entitled to non-cumulative dividends not exceeding 6 per cent. per annum, payable semi-annually in preference and priority to dividends upon the common stock in each and every year when the net earnings of the company, after deducting all the necessary expenses for the operation, maintenance and improvement

of the road shall be sufficient to pay the same. Certificates of such preferred stock shall state on their face the preference dividends to which such stock is entitled. The board of directors of the reorganized company shall consist of 15 members, 12 to be elected by holders of the preferred stock at annual meetings to be called for that purpose, and three to be elected by holders of the common stock at annual meetings to be held for such purpose at the same time and place as the meetings for the election of directors by said preferred stockholders.

No mortgage or other encumbrance shall be put upon the franchise or property of the company or any part thereof, unless the same be first authorized by vote of two thirds in interest of the holders of said preferred stock, given at a meeting called for that purpose; except, as provided in this article, said preferred and common stock shall have equal voting power.

Each holder of the existing mortgage indebtedness, including therein coupons due May 1, 1884, and interest to that date at 6 per cent. on prior unpaid coupons, shall receive in exchange therefor and payment thereof, preferred stock to an equal amount. Provided that, for the purpose of such conversion, the coupons upon the bonds outstanding under the mortgages to Frank Morison, trustee, and to the Farmers' Loan & Trust Co., trustee, shall be deemed to bear interest at 5 per cent. per annum instead of 7 per cent. per annum, and that outstanding assessment scrip and interest scrip shall be convertible into preferred stock, in like manner as the bonds into which such scrip is convertible.

Unsecured indebtedness of the company for repairs and running expenses shall be paid by the new company in money. For all other unsecured indebtedness the holders thereof shall be entitled to common stock of the new company to an equal amount.

Holders of preferred stock of the existing company shall be entitled to convert it into common stock of the new company, at the rate of 10 shares of said preferred (par \$50), for three of the new common (par \$100). Holders of common stock of the existing company shall be entitled to convert it into common stock of the new company, at the rate of four shares of the old (par value \$50) for one of the new (par value \$100).

The International Trust Co., of Boston, is to receive signatures to the agreement, where, also, the old securities are to be deposited. Two-thirds of the entire amount of the securities must be secured in order to put the plan into operation, and if by July 1, 1884, these shall not have been secured, the securities deposited are to be returned to their owners and the project abandoned. A copy of the agreement may now be found at the company's office in Boston.

Denver, Little Butte & Canon City.—This company has been organized to build a railroad from Denver, Col., southward to Canon City, about 120 miles.

Deerfield River Co.—This company is building a narrow-gauge railroad from its wood-pulp mills at Readsboro, Vt., through the valley of the Deerfield River to a connection with the Troy & Greenfield road at Hoosac Tunnel, Mass., the point of connection being about one mile from the east portal of the tunnel. The line will be about 11 miles long, running on the east side of the Deerfield River, and is to be completed by October next. It will be used chiefly for the transportation of the wood-pulp from the company's mills and for hauling material to the mills. It is being built under the supervision of Mr. George H. Hutchinson as Chief Engineer.

East Trenton.—This company has filed articles of incorporation in New Jersey to build a railroad from a point on the Trenton Branch of the Delaware & Bound Brook road around the city of Trenton to the New Jersey Steel and Iron Works, a distance of 2½ miles. Another line 2½ miles long will continue the road around the city, reaching all the principal potteries and manufacturing establishments. The new road is a branch of the Philadelphia & Reading.

Florida Railway & Navigation Co.—This company has purchased the suburban line running from Savannah, Ga., to Montgomery, and will make a steamboat landing at the last named place, sending its passengers from that point into Savannah by the railroad. This, it is said, will shorten the time of the steamboats between Savannah and Fernandina by three hours. The company has bought recently three large steamboats formerly owned by the Georgia & Florida Steamboat Co., and will run one of them on the St. Johns River and the other two on the line between Montgomery and Fernandina.

Fort Plain, Richfield Springs & Cooperstown.—Right of way has been secured for this road from the West Shore road at Fort Plain, N. Y., to Cooperstown, and work will be begun in a few weeks. An offer to build a road has been received from the firm of Warren & Hunter, contractors.

Georgia.—Mr. W. J. A. Fuller has begun suit in the New York Supreme Court to recover from this company certain unpaid coupons on Port Royal Railroad bonds, with interest from 1873. These bonds, on which suit is brought, are some of the \$500,000 of the Port Royal issue which the Georgia Railroad Co. guaranteed.

Georgia Pacific.—The directors, at a recent meeting, authorized the construction of the road from Birmingham, Ala., west to Alta, 60 miles. Work will be begun as soon as possible. The building of this section will complete a continuous line from Atlanta, Ga., to Columbus, Miss., 292 miles.

Helena & North Arkansas.—This company has been organized to build a railroad from Helena, Ark., northwest to a connection with the Texas & St. Louis road in Woodruff County. The distance is about 55 miles.

Honduras.—The Honduras Railroad, Steamship & Improvement Co. has been organized in New York to build a railroad under the concession granted to Wm. H. Warner and others, the incorporators including a number of prominent and wealthy gentlemen. The road will start from the port of Trujillo and run eastward some 20 miles to the Roman River and thence back into the interior. For some distance the line will run through a country abounding in mahogany and other valuable woods, to reach which the company will build short logging branches as required, and at some distance from the coast it will reach a region where tropical fruits are plentiful. Beyond this again the line will enter a country of wide savannas where large numbers of cattle are raised.

In addition to the railroad the company intends to run a line of steamships to carry freight from Trujillo to ports in the United States and cattle to Cuba.

The railroad will eventually be built through to the Pacific Coast, although the company does not expect to complete this extension for some time yet. The concession includes a grant of the land for four miles on each side of the line.

Iowa & Minnesota Northern.—This company has filed articles of incorporation to build a railroad on the Iowa state line northward through the central part of Minnesota to some point on the Red River. Several branches are also proposed.

Lehigh Valley.—This company, it is said, will build a branch from its New Jersey Division to the town of Flemington, a distance of about four miles.

Lowell & Framingham.—A special meeting of the stockholders was held in Framingham, Mass., April 28, to vote on the agreement of consolidation with the Old Colony Co., which has already been approved by that Company. In brief the scheme provides that the Old Colony shall issue 4½ per cent. bonds in exchange for the Framingham & Lowell bonds, and shall give one share of its stock for four shares of the preferred stock of the Lowell & Framingham, and one share for 20 shares of the common stock. After some discussion, a motion in writing, offered by H. A. Blood of Fitchburg, to the effect that the President and Treasurer be authorized to execute the necessary documents to effect the consolidation, was passed by a stock vote of 8,634 to 39. The Lowell & Framingham Railroad, which was opened to the public in 1871, is 28 miles long, and it runs from Lowell, Mass., to Framingham. It has been leased to the Boston, Clinton, Fitchburg & New Bedford Railroad, and latterly to the Old Colony Railroad. It has \$400,000 of stock and \$500,000 in 5 per cent. bonds. The company was originally the Framingham & Lowell, and was reorganized under the present name several years ago.

Manhattan.—A special meeting of the stockholders of this company is to be held in New York, May 6, to consider the action to be taken in view of the recent decision of the Supreme Court in the Metropolitan Elevated case. It is said that a proposition will be made to turn over the lines of the Metropolitan Co. to that company.

Memphis & Charleston.—This company has recently purchased from Post, Martin & Co., of New York, under a car trust agreement, 16 locomotives, 10 passenger, 8 baggage, 500 box, 50 flat, 50 coal and 30 stock cars. The total amount of the trust is \$539,952, of which the company will pay 10 per cent. in cash and the remainder in 40 quarterly payments, with interest under the usual terms of car trust agreements. The prices given are \$9,000 each for passenger locomotives, \$10,000 for freight locomotives, \$4,752 for passenger cars, \$5,095 for baggage cars, \$521 for box cars, \$395 for flat and \$435 for coal cars.

Mexican Railroad Notes.—The following notes are from the *Mexican Financier* of April 12:

The state of Zacatecas has given to Lorenzo Gallardo a concession for building a railway from the nearest point on the Mexican Central to Sombrerete, passing through Villa Ortega, Rio Grande and Nieves.

The Oriental Railway in Yucatan has finished 13 kilometers of track on its line from Progreso to Conkal, and between Mérida and Tixkokob, by way of Conkal, 26 kilometers are finished.

It is reported that work will soon begin on the iron bridge of the Mexican Meridional & Oriental Railway (Grant Gould concession) across the Rio Grande at Laredo, enabling track-laying to begin at once, and that, as the grading is done beyond Mier, it is probable that the line will be completed to Linares in a year and to the city of Victoria in 18 months. As there has been much talk about the resumption of work on this line and nothing has been done yet, the citizens of those places had better not get their expectations unduly aroused.

We have the most authentic information that Mr. Delfin Sanchez, who is at the head of the Inter-oceanic Acapulco, Morelos, Mexico, Irolo & Vera Cruz Railway, and who has been for some time in Europe endeavoring to obtain capital for its completion, has succeeded, and raised a sum of several millions, amply sufficient to complete the line between this capital and Vera Cruz, and also to continue the work on other portions of the line and equip it in a satisfactory manner. Work will be pushed ahead rapidly through to Vera Cruz, in order to secure for the line the traffic which awaits a cheaply and well constructed railway with low grades, and consequently low traffic rates, between the principal seaport of the country and the Capital. The line will go by way of Jalapa, passing through a much better tributary country than the present railway by way of Orizaba. A large amount of rolling-stock has been built in Belgium expressly for the line, and will be shipped in 10 or 12 days, arriving here in five or six weeks. The portion of the line at present in operation, which is cramped in doing the large business offering on account of the lack of rolling-stock will thus be well equipped. The new rolling-stock comprises two or three hundred cars, both freight and passenger, and 10 locomotives, all built according to the most improved American patterns after designs sent over for the purpose. It is understood that the branch to Cuernavaca will be at once pushed to completion, giving the line the traffic of that prosperous capital and its rich sugar region, while the work on the line to Acapulco will be carried on as rapidly as circumstances may permit. The Irolo Division of the line is now completed and in operation as far as Calpulalpan on its way to Vera Cruz, and the Morelos Division is built to Yautepac, with a considerable portion of the grading done on the Cuernavaca Branch.

Milwaukee, Lake Shore & Western.—This company gives notice that on Oct. 6 next it will redeem the \$199,000 in bonds now outstanding under the mortgage of March 1, 1879, at 105, with interest to date of redemption, in accordance with the terms of the mortgage.

This company has bought the St. Paul, Eastern & Grand Trunk road, which is completed from Oconto, Wis., westward 10 miles. The road is to be extended westward about 65 miles to a connection with the Lake Shore line. Some little grading has been done on this extension.

Minneapolis, Mille Lacs & Northern.—This company has been organized to build a railroad from Minneapolis, Minn., northward to Princeton, thence by Mille Lacs, Beach Lake, Winnebagoishish Lake and Red Lake to Lake of the Woods, near the northern boundary of Minnesota. Branches are also proposed to a point on Rainy Lake River from Princeton to Brainerd. The capital stock is fixed at \$5,000,000. The projected road is a north and south line, running through a section of Minnesota which has no railroad facilities except where it is crossed by the Northern Pacific.

Mobile & Ohio.—This company is having a number of cars built to meet the demands of the increasing business of the road. The cotton business has not been heavy so far this year, as is the case with most cotton roads, but there has been a very large increase in naval stores and lumber, most of the shipments being to Mobile. Arrangements are also being made to ship coal in considerable quantities from the mines in Walker County, Ala., on the line of the Georgia Pacific road, to Mobile, and to provide for this traffic the company is building a number of coal cars. The coal is received from the Georgia Pacific at Columbus, Miss. The company is also running regularly fast fruit trains from Mobile to points in the Northwest. Fruit is brought by steamers from New Orleans and other points to Mobile. To provide for the steamer traffic and also for the coal business the company is building a large new wharf at Mobile which

is to be finished in the fall. Another wharf especially intended for lumber traffic is nearly finished.

Moss Point, Scranton & East Pascagoula.—This company has been organized to build a railroad from Moss Point, Miss., south to Scranton, on the Louisville & Nashville road, and thence to East Pascagoula. It will be only about 7 miles long.

Nantucket.—Work has been begun on the extension of this road from its present terminus on the island of Nantucket to Siasconset on the south side of the island. The company expects to have this extension done in time for the summer business.

Nashville, Jackson & Memphis.—This company has been organized to build a railroad from Nashville, Tenn., by way of Franklin, Centerville and Jackson to Memphis. For most of the distance it will run through a country not already provided with railroads. It will be at some distance from the Louisville & Nashville.

New York & Long Branch.—In the examination in the suit to prevent the annulling of the contract for the joint use of this road by the Pennsylvania and the New Jersey Central companies, in Philadelphia, April 29, Mr. A. J. Cassatt, formerly Vice-President of the Pennsylvania, was examined as to the pooling contract.

"It was agreed to," said Mr. Cassatt, "on the way between New York and Philadelphia, after the principal contract had been agreed to in Mr. Lathrop's office, and was made at the suggestion of Mr. Joseph Harris. I then said it would be better to wait for a time, but he urged that a pooling arrangement be made at once, and it was decided then and there that the business should be pooled and the earnings equally divided."

The witness could not see why the Pennsylvania should not take half the business, and he expressed the belief that the principal contract was a wise one for both companies. It would require two or three years before the contract would work equitably. The Pennsylvania Railroad Co. had had a good deal of experience in the matter of pooling contracts, and has never thought of breaking up a pool because it found that it had the worst of the bargain at the start. The witness was surprised to hear that the agreement should result in a loss to the Central Railroad of nearly \$250,000. He had expected that there would be a division of earnings instead of losses. This closed the case, and argument will be heard before Judge McKean, of the United States Circuit Court, at a time and place to be appointed hereafter.

New York & New England.—The Boston *Advertiser* of April 28 says: "The plan for funding the floating indebtedness of the New York & New England Railroad Co. has been agreed upon between representatives of the stock and bond interests, and will be considered at the directors' meeting to-morrow. The plan allowed by the Legislature is the sale of shares of preferred stock for \$50 and two shares of common. The company will add a sweetener in the form of second mortgages at 60, of which it has \$2,000,000 in its treasury. It is proposed to allow stockholders to subscribe *pro rata* for blocks carrying in the aggregate one million of second-mortgage bonds and two millions of new preferred stock. For these \$1,600,000 cash and \$4,000,000 common stock will be received. The company proposes to cancel the stock received. The sale will be at the rate of 60 for the second mortgages; 50 and two shares of common for the preferred."

A meeting of the board was held as appointed on April 29, but no action was taken on the proposed plan.

New York, Philadelphia & Norfolk.—Work is being pushed on the construction of this road from Pocomoke City, Md., southward through the Virginia section of the Eastern Shore to Cherrystone. The road will be 94 miles long, and the company expects to have it completed by September next. It will be practically an extension of the Delaware Division of the Philadelphia, Wilmington & Baltimore road, being controlled by parties largely interested in the Pennsylvania Railroad. The intention is to make this line part of a short line between Philadelphia and Norfolk. The distance from Cherrystone, the terminus of the new road, to Norfolk by water is about 27 miles, and two large transfer boats are to be built, each of them capable of carrying a single passenger train or 24 freight cars. It is expected that this route will do a large business in fruits and vegetables during the season and in oysters and fish in the winter, besides opening up a large section of the eastern shore to truck and fruit farming, which cannot now be carried on, owing to the difficulty in getting to market.

New York, West Shore & Buffalo.—The Supreme Court at Rochester, N. Y., April 29, granted a temporary injunction restraining this company from issuing any bonds under the second mortgage for \$25,000,000, recently executed, or from taking any further proceeding under the mortgage.

The injunction was granted in a suit brought by Robt. H. Moore and John Zimmerman, contractors. The mortgage in question was filed for record in Kingston, N. Y., last week, and it is said that \$10,000,000 of the bonds have already been delivered to the Receiver of the North River Construction Co. The question of continuing the temporary injunction will be argued shortly.

The grounds upon which the injunction is granted are as follows: That while the plaintiffs were creditors of the North River Construction Co. the purchase price of certain real estate described was paid by the construction company and the title of said real estate taken in the name of the defendant, the New York, West Shore & Buffalo Railway Co., with the fraudulent intent to cheat and defraud the creditors of the North River Construction Co.; that as to the said lands, the defendant holds the legal title subject to a resulting trust in favor of said plaintiffs as creditors of the North River Construction Co., to the extent of their debts due from said company; and that the defendant is about to mortgage the lands affected by the trust, and will thereby render, or tend to render, the judgment asked in the complaint ineffectual.

Norfolk & Western.—This company makes the following statement for March and the three months ending March 31:

	March, 1884.	March, 1883.	Three months, 1884.	Three months, 1883.
Earnings	\$210,298	\$217,334	\$648,675	\$600,166
Expenses	134,083	113,349	401,080	352,298
Net earnings	\$76,215	\$103,985	\$247,595	\$256,868
Percent. of expenses.	64	52	64	52

This shows for the three months an increase of \$39,509, or 6 per cent., in gross earnings; an increase of \$48,782, or 14 per cent. in expenses; and a decrease in net earnings of \$9,273, or 4 per cent. The New River Division, 75 miles, is included this year, but not last, having been opened May 21, 1883.

The statement says: "The decrease of gross earnings in March is due to the temporary suspension of coal shipments, owing to the mine explosion at Pocahontas; to the greatly decreased cotton shipments, owing to the short crop of 1883; to the low rates in effect on through shipments, and to unprecedented bad weather, which retarded local shipments."

The increase of expenses is due to the expenses of the New River Division, and to the continued bad weather."

Northern Central.—This company makes the following statement for March and the three months ending March 31:

	1884.	1883.	1884.	1883.
	March.	March.	Three months.	Three months.
Earnings.....	\$402,504	\$500,865	\$1,271,023	\$1,492,082
Operating exps.....	\$229,904	\$263,437	\$729,825	\$843,791
Extraordinary exps.....	50,527	38,919	102,507	156,751
Total exps.....	\$280,431	\$302,356	\$832,422	\$1,000,542
Net earnings.....	\$182,133	\$204,509	\$438,001	\$492,440
Per cent. of exps.....	60.6	59.6	65.5	67.0

For the three months this shows a decrease of \$221,959, or 14.8 per cent., in gross earnings; a decrease of \$119,966, or 13.5 per cent., in operating expenses and of \$54,154, or 34.5 per cent., in extraordinary expenses, making together a decrease of \$168,120, or 16.8 per cent., in total expenses; the result being a decrease in net earnings of \$53,839, or 10.9 per cent.

Northern Pacific.—The following statement has been published for the eight months of the fiscal year from July 1 to Feb. 28:

	1883-84.	1882-83.	Increase.	P. c.
Earnings.....	\$7,752,177	\$5,011,542	\$2,740,635	54.7
Expenses.....	4,958,081	3,127,574	1,830,507	58.3
Net earnings.....	\$2,794,096	\$1,883,968	\$910,128	48.4
Per cent. of exps.....	64.0	62.4	1.6	.....

The average mileage this year was greater than that for last year by 44.6 per cent.

During these eight months the Land Department has sold 326,414 acres for \$1,502,221, or an average of \$4.60 an acre.

It is reported that work is soon to be resumed on the Cascade Division, running from Ainsworth northwest to Yakima, Wash. Ter. Supplies are being collected in considerable quantities at Ainsworth.

Ohio Central.—The United States Circuit Court last week heard arguments in the case of the Keystone Bridge Co., of Pittsburgh, against Thos. R. Sharpe, the Receiver of this road and the Western Union Telegraph Co. The application was for an injunction to restrain the defendants from interfering with the Keystone Bridge Co.'s possession of the bridge over the Ohio River at Point Pleasant, W. Va., and is the result of the attempt of the Receiver to take possession of the bridge some weeks ago. The testimony in the case was to the effect that the bridge was built under a contract for companies known as the Pomeroy & Ohio River Co., of Ohio, and the Point Pleasant & Ohio River Co., of West Virginia. It further appeared that the Keystone Bridge Co. has a claim for \$160,000, money unpaid under the contract. The Court reversed its decision.

Ohio Southern.—At the annual meeting last week resolutions were passed authorizing the directors to build branches of the road to reach coal and iron mines in Jackson, Lawrence and Gallia counties.

Oregon & California.—The New York Times says: "A proposition is under consideration to cancel the lease of the Oregon & California Railroad to the Oregon & Transcontinental Co. The terms of the lease, it is said, are not satisfactory to the leading stockholders in the last-named company. The lease was made in 1881 for a period of three years, with the right reserved by the Oregon & Transcontinental Co. to extend the lease for a further period of 999 years. It was stipulated that the extension of the road should be completed by October 1, 1884. For the three years the Oregon & Transcontinental Co. guaranteed absolutely the interest on the bonds and a dividend of 2½ per cent. on the preferred stock of the leased road. In consideration for this guarantee the Transcontinental received an allowance of \$600,000 of second-mortgage bonds. Should the lease be perpetuated it was stipulated that the Oregon & California should receive 35 per cent. of the gross earnings, its interest charges, and at least 2 per cent. on its preferred stock."

Oregon Railway & Navigation Co.—Work is now being pushed on the extension of the Baker City Branch to a connection with the Oregon Short Line at Huntington, some 1,600 Chinamen and 600 white men being employed upon the grading. About 110 miles of track are to be laid between the present terminus at Meacham, Oregon, and Huntington to complete the road. A large part of the grading is done, but there are a number of bridges to be built and some damage from high water to be repaired.

Pennsylvania.—This company's statement for March shows for that month, as compared with March, 1883, on all lines east of Pittsburgh and Erie:

A decrease in gross earnings of.....	\$186,753
A decrease in expenses of.....	135,877

Net decrease..... \$50,876

For the three months ending March 31, as compared with the corresponding period last year, the same lines show:

A decrease in gross earnings of.....	\$827,359
A decrease in expenses of.....	259,446

Net decrease..... \$567,913

Carrying out these comparisons we have the following statement:

	1884.	1883.	Inc. or Dec.	P. c.
Earnings.....	\$4,009,027	\$4,189,380	D. \$180,353	4.5
Expenses.....	2,598,086	2,733,963	D. 135,877	5.0
Net earnings.....	\$1,404,541	\$1,455,417	D. \$50,876	3.5
Per cent. of exps.....	64.9	65.2	D. 0.3	.....

Three months:

Earnings.....	\$11,003,594	\$11,830,953	D. \$827,359	6.0
Expenses.....	7,308,529	7,567,975	D. 259,446	3.4
Net earnings.....	\$3,695,065	\$4,262,978	D. \$567,913	13.2
Per cent. of exps.....	66.4	63.9	I. 2.5	.....

All lines west of Pittsburgh and Erie for the three months of 1884 show a deficiency in meeting all liabilities of \$265,490, being a decrease of \$642,130, as compared with the corresponding period last year. This makes a total net decrease of \$1,210,043 for the three months.

Work has been begun on a branch from this company's North & West Branch road at Nanticoke, Pa., to Morgantown. The branch is five miles long and is intended to reach the new collieries of the Susquehanna Coal Co. E. A. Tenney & Bro., of Thompsonstown, Pa., are the contractors, and work is to be completed in three months.

Pittsburgh, Cincinnati & St. Louis.—The following circular from the Superintendent of Transportation, S. H. Church, is dated Columbus, O., April 15:

"Within the next six months, new cars that have been in service six months, and all other cars that have not been light-weighted for one year, should be reweighed and marked at scales where cars can be had and there are facilities for marking them. All cars of the Southwestern System and Union Line, National Line, and individual cars at home on the above lines, should be included in the weighing.

"Scales must be in proper order and weigh correctly, and cars clean and dry when weighed. Cars must be weighed singly and stopped on the scales before weighing. Weighmasters will keep a record of all cars, light-weighted and report the weights to this office on Monday of each week. If none are weighed they will send a blank report. Car inspectors or persons in charge of marking will erase the old light-weight marks, and stencil cars as follows: On both sides of cars the place, weight and date of weighing, thus—'Denn. Wt. 18000, 83.' Box, stock, gondola, and coal cars with fixed ends will be marked on ends thus—'Wt. 18000.' Gondolas without fixed ends will be marked only on the sides in the centre of car, that the marks may not be covered by the stake pockets. On stock cars with the double deck in, the letters 'D. D.' must be placed after the date on sides, thus—'Cols. Wt. 19300, 83 D. D.' and after the weight on ends, thus—'Wt. 19300 D. D.' On first weighing of all new cars the word 'New' will be placed after the marks given above, and at the end of six months after date of weighing such new cars, they must be reweighed and the correct weight marked, erasing the word 'New.'"

"Cars of any of the lines above named should be weighed at the scales of any of the lines that are light-weighting cars. "Note.—In weighing loaded stock cars that have been light-weighted with double deck in, should the double deck be out of car, weighmasters will deduct 1,200 pounds from the light weight of the ordinary sized stock cars, and 1,500 pounds from the large stock cars of 40,000 pounds capacity, that being the weight of material in double deck, and add 1,200 and 1,500 pounds respectively to light weight of single-deck cars that have had double decks put in after being weighed as single-deck cars."

This circular applies also to the Chicago, St. Louis & Pittsburgh, the Jeffersonville, Madison & Indianapolis and the Indianapolis & Vincennes roads.

Philadelphia & Reading.—This company's statement for March and the four months of its fiscal year from Dec. 1 to March 31 gives the earnings of the railroad lines as follows, the Central Railroad of New Jersey being included this year, but not last year:

	1884.	1883.	1884.	1883.
	March.	March.	Four months.	Four months.
Earnings.....	\$1,456,180	\$731,964	\$2,188,144	\$1,669,240
Expenses.....	937,845	532,226	1,470,000	978,497
Net earnings.....	\$518,337	\$199,738	\$718,075	\$690,743

For the four months..... \$5,754,071 \$2,929,258 \$8,683,029 \$6,527,249
Expenses..... 3,692,006 1,989,933 5,682,539 3,696,459

Net earnings..... \$2,062,065 \$939,325 \$3,000,390 \$2,830,790
This shows for the Reading lines proper for the four months a decrease of \$772,578, or 11.8 per cent., in gross earnings; a decrease of \$3,853, or 0.1 per cent., in expenses, and a decrease of \$768,725, or 27.2 per cent., in net earnings.

The Central rental was \$472,049 for March and \$1,898,189 for the four months, showing a loss on that line of \$272,311 for the month and \$958,864 for the year thus far. The traffic reported is as follows:

	1884.	1883.	1884.	1883.
	March.	March.	Four months.	Four months.
Passengers carried.....	1,776,391	970,332	7,054,368	3,658,240
Tons merchandise.....	764,933	580,828	2,713,902	2,160,157
Tons coal.....	716,911	660,913	2,982,739	2,533,687
Tons coal on colliers.....	42,161	45,658	167,810	162,948

Of the traffic in March of this year the Central line carried 763,148 passengers, 165,455 tons merchandise and 340,138 tons of coal. The increase this year was entirely from this line.

The statement for the Philadelphia & Reading Coal & Iron Co. is as follows:

	1884.	1883.	1884.	1883.
	March.	March.	Four months.	Four months.
Earnings.....	\$914,465	\$1,160,494	\$3,960,719	\$4,104,851
Expenses.....	1,029,965	1,148,726	4,364,473	4,094,390

Net or defic. D. \$115,500 N. \$11,755 D. \$403,754 N. \$10,452

This shows for the four months a decrease of \$144,132, or 3.5 per cent., in gross earnings and an increase of \$270,074, or 6.6 per cent., in expenses, changing the small net earnings of last year into a large deficit.

The coal mined was as follows:

	1884.	1883.	1884.	1883.
	March.	March.	Four months.	Four months.
By Reading Coal & Iron Co.....	245,248	301,737	1,063,491	1,176,930
By tenants.....	56,242	117,151	243,822	447,981
Total.....	301,490	418,888	1,307,313	1,624,911

The decrease here shown furnishes the chief explanation of a large part of the falling off in traffic, which is shown above on the Reading lines, in spite of the addition of the Central this year.

Taking both companies together, we have the following, including the Central lines this year:

	1884.	1883.	1884.	1883.
	March.	March.	Four months.	Four months.
Earnings.....	\$3,102,609	\$2,829,724	\$12,644,948	\$10,632,100
Expenses.....	2,469,734	2,327,223	10,047,012	7,790,858

Net earnings..... \$602,875 \$702,501 \$2,597,936 \$2,841,242

For the four months this shows an increase of \$2,012,548, or 19 per cent., in earnings; an increase of \$2,256,154, or 29 per cent., in expenses, and a decrease of \$243,606, or 9 per cent., in net earnings.

The figures above do not include anything for interest or rental, the net earnings being the sum from which those charges are to be paid.

If the Central rental for the four months be deducted from the net earnings of the joint companies, the balance remaining is \$699,447, which is less than the net earnings last year by \$2,141,795, or 75.4 per cent. The loss in net earnings this year is large enough to cause serious concern.

Providence Terminal Facilities.—The special committee of the Rhode Island Legislature has reported unanimously an act enabling the city of Providence to condemn certain lands for improved terminal facilities, but providing that none of the improvements shall be made until they are subjected to the approval of the City Council to be elected this fall, and to be in office in 1885. Three years are allowed for the condemnation. The city can fill the cove and cove promenade or not, as suits its convenience. The proposed encroachment upon Canal street is prevented by a clause making the river bed not less than 80 ft. distant from the present west, eery line of that street. The city is empowered to purchase sell or exchange any land with the railroad companies, and to build a passenger station and let it to the railroad corporations. This will prevent the shutting out of the New York & New England or any other railroad company desiring suitable passenger depot accommodations. The incoming Council is also empowered to accept any plan or plans which will, in detail, conform to the committee's report. The city is authorized to borrow \$1,000,000 for the work, to create a sinking fund and issue bonds for the same.

Rochester & Pittsburgh.—This company has executed an equipment mortgage covering an issue of \$4,000,000 in 6 per cent. bonds, having 40 years to run from Feb. 1, 1884.

Of these bonds \$1,100,000 have been taken by stockholders of the company, and \$900,000 of the proceeds have been invested in new equipment. The remaining \$2,900,000 of the new bonds are retained by the company, to be issued as required.

The arbitrators appointed to settle the questions in dispute between this company and the New York, Lake Erie & Western, Messrs. Chauncey M. Depew and John A. Wright, have agreed upon Mr. Allan Campbell as the third member of the board. Mr. Campbell was recently Comptroller of the city of New York, but was formerly for several years President of the Consolidation Coal Co. and the Cumberland & Pennsylvania Railroad.

Rochester Terminal.—Surveys have been made for a line from Rochester, N. Y., to a point near the mouth of the Genesee River on Lake Ontario. It is reported that this is to be a new line by which coal and heavy freights can be delivered at the Lake.

Rome, Watertown & Ogdensburg.—This company makes the following statement for March:

	1884.	1883.	Inc. or Dec.	P. c.
	March.	March.	I.	D.
Earnings.....	\$133,162	\$120,623	\$12,539	10.4
Expenses.....	86,021	120,660	D. 34,645	28.3

Net or deficit..... N. \$47,141 D. \$43

Per cent. of exps..... 64.7 100.1 D. 34.5

The net earnings this year compare with a deficit of \$43 last year, making a net gain of \$47,184. Taxes are included in expenses. For the six months of the fiscal year from Oct. 1 to March 31 there was a gain of \$114,800 in net earnings.

San Antonio & Northwestern.—It is proposed to build a railroad from San Antonio, Tex., northwest to Menard, about 130 miles, with a branch 20 miles long to Fredericksburg. It is said that offers have been made to undertake the building of the road, provided a reasonable amount of stock is taken up in San Antonio.

St. John Bridge.—The St. John (N. B.) Telegraph says: "The work of constructing the piers of the railway bridge at the Falls continues to progress rapidly. It is expected that the western pier will be completed on Monday and the eastern one a few days later. Yesterday photographs of the work as it stands were taken from a number of points of observation. The massive piers present a strong appearance and look as if they would bear double the weight that they will at times be compelled to carry."

St. Louis & Cairo.—This company has reduced the wages of its employes from 5 to 15 per cent. Those getting \$75 per month are reduced 5 per cent.; those getting between \$75 to \$250 per month are reduced 10 per cent.; those getting over \$250 are reduced 15 per cent. The alleged cause of the reduction is dullness in business and it is thought that the old figures will be restored within three months.

St. Paul, Eastern & Grand Trunk.—This road has been sold to the Milwaukee, Lake Shore & Western Co. for a price which has not been made public. It was intended to run from Oconto, Wis., to St. Paul, but only 10 miles of the road have been finished.

Toledo, Cincinnati & St. Louis.—The United States Circuit Court has ordered the sale of all the divisions south of Delphos on the Court House steps in Cincinnati, June 25. In the terms of sale it is provided that no bid will be accepted on the Iron road till the bidder has deposited with the commissioner \$50,000 in cash or \$100,000 in the first-mortgage bonds of the road. No bid will be accepted on the Southeastern Division until the bidder has deposited \$20,000 in cash or \$50,000 in first-mortgage bonds of the road, and of the purchase price at least \$20,000 shall be paid in cash. No bid will be accepted on the Dayton Division unless the bidder deposits \$20,000 in cash or \$100,000 in first-mortgage bonds of the road, and of the purchase price at least \$20,000 shall be paid in cash. The Proxy Committee of the Southeastern Division has received the assent of nearly \$1,200,000 bonds to its plans.

Holders of Southeastern Division first-mortgage bonds are notified that the time for signing the agreement has been extended until May 10. After that date no signatures will be received except upon payment of 1 per cent. on the par value of the bonds.

Troy & Greenfield.—A proposition has been submitted to the Massachusetts Legislature by parties who are said to be acting for the Boston, Hoosac Tunnel & Western Co. They offer to buy this road (including the Hoosac Tunnel) from the state for \$4,000,000, under such reasonable conditions as the Legislature may require.

The Boston Traveler says: "The seven-year contract between the railroads operating over the Troy & Greenfield Railroad and Hoosac Tunnel provides that the roads in question shall retain 50 per cent. of the gross earnings while running over the state road. Feb. 1 in each year the railroad Commissioners are required to ascertain as nearly as practicable the actual cost to the roads, of their operating expenses while upon the state's railroad. The Commissioners have made their report to the Governor and Council upon the business of last year, so far as the Fitchburg Railroad was concerned. Their report shows that 50 per cent. of the gross earnings was very near the actual cost, since they award to the corporation the sum of \$213,245, being 50.295 per cent. of the gross earnings of the state road for the year ending Sept. 30, 1883, to be paid by the state for the operation of the road for that year.

The amount due the state is..... \$210,747
Amount received by the state..... 210,767

Balance due Fitchburg Railroad..... \$20

"The award of the Commissioners for the preceding year of 1882 gave the Fitchburg Railroad between 55 and 58 per cent., or about 5 per cent. more than for the last year. This award is not a binding upon either the commonwealth or the railroad, as either party can appeal to the courts for a final arbitration. The decision in favor of the Fitchburg Railroad results in the application of the same percentage of operating expense to the other roads running over the state road."

Union Pacific.—A general order has been issued, taking effect May 1, under which salaries will be reduced as follows: Those over \$3,600 per year, 15 per cent.; between \$3,600 and \$1,000 the reduction will be 12½ per cent., and on all salaries under \$1,000 it will be 10 per cent. These reductions apply to all employes of the road except the locomotive engineers and firemen.

Western Maryland.—This company has let a contract for a short extension of its track from the present terminus in Hagerstown, Md., to a connection with the Cumberland Valley road.

Wisconsin, Iowa & Nebraska.—The contract for grading between Wilson, Ia., the present terminus, and Cedar Falls, a distance of 8 miles, has been let to Mr. G. D. McDonald, of Spencer, Ia., and the bridging to Mr. G. W. Schnellbacher. The ties and rails are already on the ground.